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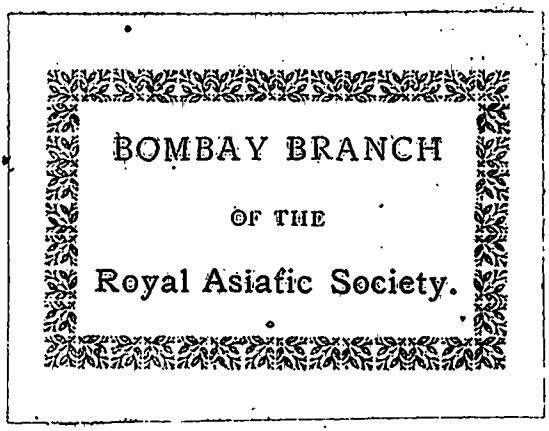

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CYBELE BRITANNICA;

OR

BRITISH PLANTS,

AND THEIR

GEOGRAPHICAL RELATIONS.

BY

54625

HEWETT COTTRELL WATSON.

"There is scarcely any well-informed person, who, if he has but the will, has not also the power to add something essential to the general stock of knowledge, if he will only observe regularly and methodically some particular class of facts which may most excite his attention, or which his situation may best enable him to study with effect."

HERSCHELL.

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NOTE.—As the title-page of this volume bears the date of 1847, the year of its publication, it may be proper to mention that two-thirds of the volume was printed in 1846. Such being the case, the indicated areas, census, limits, &c. of the species cannot be considered as brought up completely to the state of recorded knowledge at the close of 1846; although most of the habitats published in the course of that year have been taken into account with the other data used in describing the distribution of the species. On page 340, Potentilla rupestris is inadvertently referred to the "English" instead of the "Local type of distribution." On page 379, the type (British) and region (Agrarian) of Myriophyllum alterniflorum are omitted.

INTRODUCTORY EXPLANATIONS.

NATURE makes plants more or less dissimilar in their forms and other physical characters; and upon the degrees of resemblance which he can trace in those characters, MAN founds his technical arrangement of their names and descriptions in books. The actual groupings of plants, seen in the wilds of nature, are totally different from those invented by botanists for the convenience of systematic arrangement. Species which are widely dissimilar in their physical characters, so far from being widely sundered in nature, are frequently found growing in the most neighbourly proximity; while other species, which are so similar that they can scarcely be distinguished by any written characters, may have their geographical position in countries the most remote, or in soils the most different.

The botanist who looks with an observant eye to the floral productions of the earth, as a whole, or to those of any considerable section of its surface, may soon discover almost as much of variety in the distribution of the plants, as is seen among those physical characters of shape or structure, in accordance with which they are technically classified in books.

Hence arises the study of Geographical Botany, or investigations into the distribution of plants over the surface

of the earth, as a branch of knowledge distinct from that which is more exclusively concerned with the technical classification and description of species. This study has been variously denominated "Phyto-Geography," "Botanical Geography," "Geographical Botany," and "Geographical Distribution of Plants." These compound names are all of them objectionable; they are inconveniently long for titles of books, and none of them can be said sufficiently to express the scope of the present work. The author ventures therefore to substitute the mythological name of CYBELE; that is, the name of a Goddess who was supposed to preside over the productions of the earth. The name of 'Flora' has long been used for those catalogues of plants, in which are described the species of any definite section of the earth; that of 'Cybele' appears quite as applicable to one which is intended to show their relations to the earth, as local productions of the ground and climate.

Though a knowledge of plants, and a knowledge of their geographical relations, may be deemed two distinct subjects of study, yet they were perhaps never wholly disjoined, and there is now certainly an increasing tendency to bring them into closer connexion. On the one side, indeed, it is impossible to disconnect the two kinds of knowledge. The technical botanist often knows species sufficiently well in the herbarium or the garden, although understanding extremely little about their geographical relations; but the botanical geographer cannot remain unacquainted with species, while investigating their distribution. The latter takes a march forward, beyond the ground of the technical describer, or the student of species; and before he can do so, he must first pass over that ground; tarrying upon it awhile, to make himself acquainted with species, their names and synonymes, and their technical classifications.

Bearing in mind, then, that the study of geographical relations is an advance onward, which cannot be successfully made, unless a fair knowledge of species has been previously acquired, it becomes easy to explain why the distribution of plants has hitherto attracted only a very small share of attention from the botanists of Britain. The great — the very great majority have never attempted or wished to go beyond the ground first occupied. Whether their attention has been restricted to the comparatively narrow field of British botany, or whether it has ranged widely over the flora of the whole earth;—whether it has been directed to favourite groups of plants, or whether it has sought to compass the whole vegetable world; in either of these cases, sufficient mental interest and employment have usually been found in the study and description of species, or in their systematic classification.

As this latter kind of knowledge is increased in amount and accuracy, the botanical geographer becomes facilitated in his own studies; and of course his investigations will be most successful with those plants and those countries, which have been most thoroughly examined by the collectors and describers of species.

Britain and Germany, Sweden and France—countries whose floral productions have been long studied and known —may now be said to have their botanical geographers, as well as their technical describers of plants. And the same department of phytological science is becoming an important feature even in the descriptive Floras of countries, the plants of which are now, for the first time, publishing in distinct and complete Floras; as witness the admirable works on the botany of Russia, of the Canaries, and of the Antarctic Lands,—respectively, by Ledebour, Webb, and Hooker.

As yet, however, few British botanists have directed their attention towards the geographical relations of our native plants. We have had general *Floras* of Britain from Ray, Hudson, Smith, Withering, Gray, Lindley, Hooker, Macgillivray, Macreight, Babington and other authors; but nothing like a *Cybele* has hitherto appeared: unless we except two small volumes which were printed for the writer of these pages, in the years 1832 and 1835, under the titles of 'Outlines' and 'Remarks;' to which may be added a 'First Part' of the more expanded form of the same work, printed in 1843, but not continued into a Second Part. Some slight approaches towards a Local Cybele had been made before the present author's own efforts commenced; and one among these which seems most deserving of mention here, was an 'Essay on the Geographical Distribution of Plants in the counties of Northumberland, Durham and Cumberland,' from the pen of the late Mr. Winch.

Of works which supply one kind of materials required in constructing a general Cybele of Britain—figuratively, in the same sense that bricks are materials required in constructing a house,—'The Botanist's Guide through England and Wales,' by Turner and Dillwyn, more especially merits notice here. That useful compilation (including also many original facts) gave name and plan, as likewise much of the contents, to another publication of the same kind, extended to Scotland also; which was printed in 1835, under the title of 'New Botanist's Guide to the Localities of the Rarer Plants of Britain.'

In addition to facts, or alleged facts, which were brought together in those two more comprehensive works, a large amount of similar materials may now be found in the many local floras and lists recently published; as well as in the

numerously recorded habitats of the rarer plants, which are scattered through the scientific periodicals and other works.

The author has likewise been favoured with many lists and localities in manuscript, frequently authenticated by specimens for his herbarium. The Botanical Society (of London) has of late become very useful as a medium through which to obtain similarly authenticated facts. And besides materials thus brought together, through the observations of other botanists, and assistance liberally afforded to him, the author's own notes and collections have accumulated into a bulk formidably great, with reference to the habitats and local situations of plants.

From these accumulating materials, it has long been wished to construct a general 'Cybele' of Britain; that is, some kind of treatise, in which the facts should be first condensed into an orderly arrangement for reference, and should be afterwards grouped and connected into more general views and illustrations of vegetable distribution. The facts need to be sifted from their many intermingled errors,—to be reduced into order,—to be arranged according to their several kinds,—to be grouped and generalised. This having been accomplished, we may then advance towards the causes of vegetable distribution; namely, an investigation of those physical conditions, past and present, which determine the floras of different countries. A Cybele of the vegetable kingdom at large would be a vast undertaking. Measured by the life and powers of a single individual, it would be impracticable and infinite. A Cybele of British plants only, will require the co-operation and successive labours of many botanists, before it can approximate to completeness within its much more limited scope. It is hoped that the present work, should the author be enabled to carry it to a conclusion, will at

any rate leave the subject considerably more advanced than he found it in 1832.

In his earliest volume, the 'Outlines' (1832), which was only the imperfect and unpublished essay of a beginner, the objects of a Cybele were sought to be shown, in some incipient degree, by first giving slight general descriptions, and afterwards noticing the distribution of the species severally. In the subsequently published volume, or second edition, the 'Remarks' (1835), the general descriptions were enlarged and amended; while the principal details about the distribution of species, singly considered, were condensed into tabular lists. At the same time, the local dispersion of the species was shown further in detail, by the compilation of county lists and localities, published in the 'New Guide,' before mentioned.

The 'Third Edition' was commenced with much more ample details respecting the distribution of individual species; and it was then intended that the general descriptions and summaries should follow those special notices. It was considered that the general views could be made more exact and complete, if the facts of detail were first brought into methodical arrangement for reference. But the experience acquired in preparing and printing the 'First Part' of the third edition, led to the abandonment of that voluminous project; in showing that a longer life than the author ought to calculate upon, and a larger outlay of money than he might be able to continue devoting to it, would certainly be required for completion of a work which was commenced on so wide a scale. Many years of labour, and some thousands of pounds, must have been expended before that edition could have been brought to a satisfactory conclusion.

A subdivision into smaller treatises was then thought of, by way of substitute; each treatise being devoted to some

special section or part of the general subject, and each being made complete so far as the single section was concerned. By this change it was sought to lessen the chance of leaving only a fragment of one large work; in which, after much had been commenced, nothing might reach completeness. This proposed change of plan was laid before some of the author's botanical friends, by a printed circular, which the Editor of the 'London Journal of Botany' honoured him by re-printing amid the "Botanical Information" of that influential periodical.

The change was not approved, however, by the friends to whom it was thus communicated. Still, as there would really be very small chance for the completion of any work on the scale of the discontinued third edition, it seems not advisable to fall back upon that lengthy undertaking. The present, therefore, is an attempt to take a middle course, by greatly condensing the notices of species-distribution within Britain, and postponing those which relate to the distribution of the same species through other countries, until completion of the British portion;—as also all details of special localities, which are equally reserved for a distinct publication.

Having himself often felt disappointed at the non-completion of works, the publication of which had been commenced in successively issued Parts, the writer of these pages has always felt reluctant to adopt that course; apprehending lest unforeseen circumstances might equally come in the way to procrastinate, or even wholly prevent the completion of his own. But in formerly avoiding publication, he found sufficient practical objections in the plan of private distribution, to induce him now to take the more usual course. Reluctance was frequently felt in offering copies to individuals, lest he should only be troubling them

with a book of little or no interest in their eyes. On the other side, those who really wished to possess copies, were sometimes equally shy in asking for them. And even in cases where the parties better understood each other, it was often found troublesome or expensive to get the copies to their intended destinations; particularly where that destination was in a foreign country. Thus, publication has appeared to be the more convenient course, on the whole. But in publishing the first volume, the author wishes it to be distinctly understood, that he thereby makes no greater pledge for ultimate completion, than is implied by a strong desire and present intention to complete, at least, that portion which will relate to the distribution of plants within the limits of Britain. It is obvious that the work cannot be deemed complete, in any sense, until the species-distribution of all the phænogamic orders is finished. About one-third of the whole will be included in the present volume. Two other volumes will complete the distribution of species; and when it has thus reached the Graminа or Pteridioides (which soever may be made the final order), the character of incompleteness will no longer attach to the publication. A fourth volume is intended to include general views and summaries, founded on the details and facts of the three earlier volumes. But while the author hopes to render his final volume a contribution of some value to science, the absence of that volume will not materially detract from any usefulness of the three earlier volumes, taken by themselves.

Although it is now designed that the more general views and summaries shall follow those notices about the distribution of species, severally, which will occupy much of the three earlier volumes of the present work, it still appears necessary here to anticipate general results in some slight

degree, in order to render such notices clearly intelligible to any botanists who may have hitherto given little of their attention to the subject of geographical botany.

The indigenous and naturalised British plants amount to fourteen or fifteen hundred species. Let it be supposed that some patiently industrious botanist takes an equal number of maps of Britain, in which the boundaries of counties are traced, but all else is left blank. Devoting a map to each species, he enters on the map the name of every county in which he has seen the species himself, or has been informed that it grows. He then compares his maps together, and finds the utmost inequality in the distribution of the species, as indicated by the names on his maps. Several of the maps are still left wholly blank, with the exception of some single county on each; as, for example, those devoted to Cynodon Dactylon and Antheri-cum serotinum. In other maps, the names of two counties will appear; as in those for Erica ciliaris and Astragalus alpinus. In some of them, there will be three counties named, as in those for Gentiana nivalis and Saxifraga rivularis. And it is not unlikely that such instances might be found, showing every successive number from one county up to fifty or sixty counties. But our botanist, thus at work, would find none of his maps with more than fifty or sixty counties marked on them, unless his own individual investigations had extended through the many counties, for which we still want Floras, or lists of their more common species. Could our libraries supply him with lists of species, the common equally as the rare, for every single county, it is probable that he would then find about two hundred species reported in all the eighty-two or eighty-three counties of Britain. Some species would then appear to be absent from one county only, others from two

counties, others from three counties; and so reckoning downwards, until we got to the maps in which only a single county was marked for some of the plants.

In thus projecting the distribution of species on maps, by way of illustrating facts as they exist in nature, those two circumstances of distribution are brought under view, which have usually received some attention from the describers of plants;—who, by the by, frequently appear to attach no other idea to the words "geographical distribution of plants," than the two circumstances here alluded to. These are, first, the extent of geographical surface, over which a species is spread; and, secondly, the greater or less frequency of the species within that space. The first is shortly and conveniently expressed by the term AREA of a species. And the word CENSUS, almost as well naturalised among us, may be used to indicate the floral population of the island, or of any part of it. But between the human and the floral census of a country, there is this important difference, that in the former we count *individuals*, while in the latter we can count up only *species* or *habitats*. Thus, too, the floral census has itself a two-fold meaning or application. We may, census-like, reckon the number of species in a country, in an order, or in a genus; and thus institute numerical comparisons between countries, orders, or genera. Or, we may reckon up the number of habitats for species, &c., and then make comparisons between their relative frequency.

To return to our supposed maps of species. Any other sections of Britain, larger or smaller than counties, might be taken for the like purpose of illustrating the areas and census of species; and they would equally tend to show a local, a partial, or a general distribution of the plants. The more numerous were the sections taken, the less numerous

would be the species appearing in all of them. Perhaps, there is not a single native species, whose area is sufficiently wide, and census sufficiently high in degree, as to make it a native of every (rural) parish. Probably two hundred species occur in every county; although this is stated only in conjecture. And the number common to England, Wales, and Scotland—unequal as these ancient divisions are—may possibly amount to eight hundred species.

The areas of species may be sufficiently shown by tracing them through counties, or even much larger sections of Britain. To indicate their census in a satisfactory manner, it would be necessary to increase the number of sections, and thus make them include much smaller spaces singly. For example, it may happen that two species are found in the same twenty counties each; and, tested by counties, they would thus appear to have the same areas and same census — which we will suppose expressed by the No. 'XX.' Yet it might also happen, on subdividing the twenty counties each into twenty sections, that one of the two species is still found in all the four hundred sections, while the other species appears in only one hundred of them. Their apparent census would thus vary according to the test adopted, and must be expressed by the Nos. '400' and '100;' or by 'XX, 400' and 'XX, 100.'

To this supposed case there may be no exact parallel in nature; although some approximation thereto might certainly be found. In the present work, as will shortly be explained, the counties of Britain are grouped into eighteen "provinces." Tormentilla officinalis and Hypericum pulchrum are found in every province; and it is not improbable that they would equally be found in every county, if looked for. But if we could subdivide all the counties into sections of a square mile each, the Tormentilla would

assuredly be found in many more of these square mile sections, than would the Hypericum. Or, at the other extremity of the scale, Cynodon Dactylon and Erica vagans have been ascertained only in one province; and in subdividing that province into square miles, the Cynodon might be confined in one of them, while the Erica would extend into several.

No test which it is possible to apply to all species alike, can perfectly show their census — comparative rarity or commonness. We cannot count the individual plants of a species, as we would count the people of a kingdom; and in an island so large as Britain, we cannot ascertain the number of special localities, unless it be for some few extremely local species. Their census must therefore be vaguely estimated by the experience of individual observers, who will never agree in their estimates; or it must be tried by some test which is adapted to show the number of *spaces* (not the number of precise *places*) in which each one occurs. The nearer we can reduce the "spaces" into "places," by increasing their number, and diminishing their extent, the more exact will the test become. As yet, the want of recorded information, particularly about the local distribution of the more common species, unavoidably throws us upon spaces which are too large for much precision.

One object of the present work, will be that of showing the *area* of each species with greater exactness than has hitherto been done, or even attempted by any other writer on the plants of Britain; and a second object, combined with the former, will be to take the first steps towards forming a census, by a numerical scale. Something of this kind may be seen in the "List of Species," in the 'New Botanist's Guide' (England and Wales, pp. 355—398, and Scotland, pp. 521—539,) where all the counties are enu-

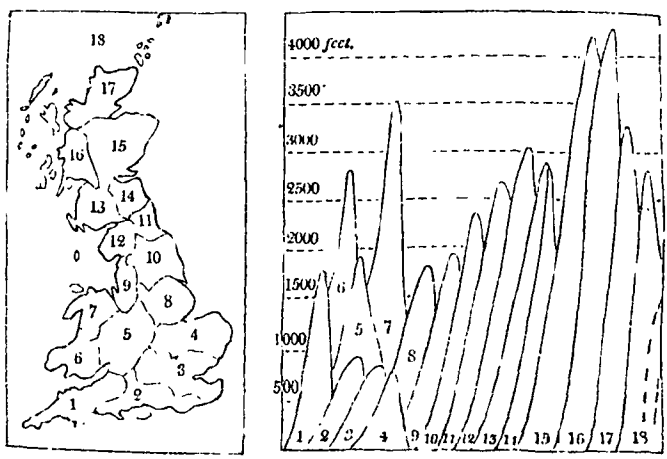
merated, within which any localities are recorded for the species. But in that work these index-lists are of course limited to the "rarer plants;" the localities of which formed the object of the Guide. Here, on the contrary, the purpose is different; and it becomes necessary to show the area and census of every species, whether rare or common, by a formula which shall apply to all alike.

How is this to be accomplished? To enumerate in print all the counties for each species in succession, would prove a very lengthy and expensive method. And if this were done, the multitude of county-names, constantly to be repeated under the more widely distributed species, might rather confuse than assist the ideas of those botanists who wished to ascertain their areas. At best, too, the number of counties would be exceedingly inexact, through the want of county-lists of the commoner species: some of the more common might even be made to appear the less common species, through that deficiency.

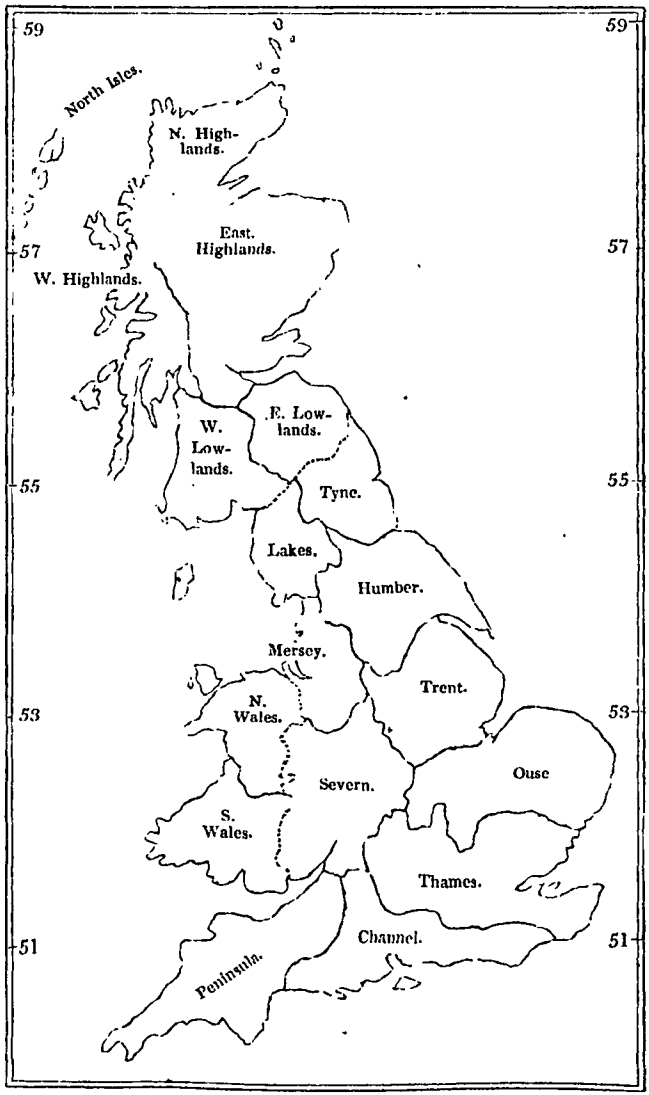
The counties being thus too numerous, while the three ancient political divisions (England, Wales, Scotland) are too few and unequal for the objects of this work, an intermediate set of sections became necessary,—larger than counties, smaller than kingdoms. In fixing upon such intermediate sections, it has appeared most convenient to make them in conformity with the old established divisions into kingdoms and counties; as much regard being still given to the physical geography of Britain, as is consistent with the prescribed rule. In forming these sections, a mesial line was first traced from the south coast of England, northwards into the Highlands of Scotland; the line corresponding with the boundaries of counties, and being traced in that course which would best divide the counties whose rivers flow to the east coast, from those whose waters

are emptied into the western ocean. These two longitudinal divisions were then transversely subdivided into PROVINCES, or groups of counties which together constitute the basin of a principal river, or have some other physical peculiarity in common. The mesial line was not continued northward of Inverness, where Scotland becomes very narrow, and counties extend from the east to the west coast. The wide county of Inverness itself, also extending from east to west, is bisected by the line; the eastern portion (Moray, including the small counties of Elgin and Nairn) being thus divided from the western portion.

In this manner eighteen "Provinces," or groups of counties, have been marked out on the map; and though still being arbitrary divisions of the surface, by conforming to county boundaries, they will be found more natural sections of the island than are the counties themselves. The cut on the opposite page shows their geographical positions and names; and the one underneath, the comparative



Districts. Altitude of Districts.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59
North Isles.
N. High-
lands.
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Highlands.
57
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W. Highlands.
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55
55
Tyne.
Lakes.
Humber.
Mersey.
Trent.
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Wales.
53
53
Ouse
Severn.
S.
Wales.
Thames.
Channel.
51
51
Peninsula.

heights attained by the loftiest summits of the respective provinces. The Nos. on the same diagram will show to which of the provinces the cones of altitude belong. The subjoined list of the counties, included in each province, will clearly indicate the provincial boundaries for any map on which the counties are engraved.

List of Provinces and their included Counties.

1. PENINSULA.—Cornwall, Devon, Somerset.
2. CHANNEL.—Dorset, Wilts, Isle of Wight, Hants, Sussex.
3. THAMES.—Kent, Surrey, Berks, Oxford, Bucks, Middlesex, Herts, Essex.
4. OUSE.—Suffolk, Norfolk, Cambridge, Bedford, Huntingdon, Northampton.
5. SEVERN.—Gloucester, Worcester, Warwick, Stafford, Salop, Hereford, Monmouth.
6. SOUTH WALES.—Glamorgan, Caermarthen, Pembroke, Cardigan, Brecon, Radnor.
7. NORTH WALES.—Montgomery, Merioneth, Caernarvon, Denbigh, Flint, Anglesea.
8. TRENT.—Leicester, Rutland, Lincoln, Notts, Derby.
9. MERSEY.—Cheshire, Lancashire.
10. HUMBER.—York.
11. TYNE.—Durham, Northumberland.
12. LAKES.—Westmoreland, Cumberland. (Isle of Man).
13. WEST LOWLANDS.—Dumfries, Kirkcudbright, Wigton, Ayr, Lanark, Renfrew.
14. EAST LOWLANDS.—Berwick, Roxburgh, Peebles, Selkirk, Haddington, Edinburgh, Linlithgow.

15. EAST HIGHLANDS.—Fife, Kinross, Clackmannan, Stirling, Perth, Forfar, Kincardine, Aberdeen, Banff, Moray (including Nairn, Elgin, and the north-east of Inverness).
16. WEST HIGHLANDS. — Dumbarton, Argyle, Inverness, westward of Loch Erricht. Isles adjacent, from Arran to Skye.
17. NORTH HIGHLANDS.—Ross and Cromarty, Sutherland, Caithness.
18. NORTH ISLES.—Hebrides, Orkney, Shetland.

In some instances, on account of political or other circumstances, small portions of one county are included within the ordinary boundaries of some adjoining county; and where this happens with counties in different provinces, the included portions are to be regarded as parts of the province, within which they are actually situated. For instance, the extreme northern part of Lancashire, one of the Mersey counties, runs like a wedge into the Lake province, and is truly a part of the latter in its physical relations.

In some few cases, a little additional extension to the limits of the provinces may be unavoidably given, where the exact position of habitats on the borders of counties has not been recorded in such terms as to indicate within which county or province the plant does really grow. Thus, in the Floras or catalogues of plants found about Bristol, Bath, Tonbridge Wells, Banbury, and Glasgow, situate on the borders of provinces, the localities of several species are so recorded as to leave untold their true position with relation to county or province-boundaries. In these cases, the doubtfully placed localities are assumed to be within the same county as the town itself, although the fact may be otherwise; but any mispositions, which may arise out of this assumption, must fall within a small distance, and can

rarely be errors of any material consequence to the subject under consideration.

Before adverting to another and different manner of dividing the botanical surface, the uses of these "Provinces" may be shortly recapitulated. First, they afford a method for showing the areas of plants, as facts in nature, independently of all theoretical explanations and reasons. Secondly, they may be taken as a primary step towards a census of the species, in respect of their comparative frequency; those most widely and generally distributed, even in large spaces, being usually also the most common species. With increasing knowledge, the census will probably be founded on counties or smaller sections; though this degree of exactness cannot be perfectly reached at present. Thirdly, so far as it is shown, the distribution of the species will be shown with greater comparative accuracy; because our lists for provinces can be made much more full and accurate, than would be the case with county lists of species, or lists for other smaller sections. Fourthly, much circumlocution and tedious enumeration of names may be avoided, through referring to the distribution of species by few provinces, rather than by many counties. But, fifthly, it is to be remembered that these provinces are only arbitrary sections, adopted for convenience in description and reference, instead of counties. So far as they do correspond with peculiarities in the physical geography of Britain, it is an advantageous circumstance; although such a correspondence is not necessary to their object or use. The divisions next to come under consideration, on the contrary, are natural; inasmuch as they will be traced in correspondence with the actual distribution of plants, and without reference to political or other conventional boundaries.

The attention of readers must now be requested to the distribution of plants in *Ascending* or *Climatic Zones*, under the combined influence of geographical position and configuration of surface. It is a familiar fact, that the climate of Britain is found to deteriorate and become colder, as we pass from south to north; and it is almost equally well known, that a similar change is perceived, as we pass from the coast line or open plains into the mountain valleys. The difference of climate between the bases and summits of the loftier hills, is still wider than that between the southern and northern extremities of the island. None of the Highland hills are sufficiently lofty for their summits to reach the line of perpetual and continuous snow, such as is seen on the Alps or Pyrenees; yet so cold is the climate near their summits, that large isolated masses of snow remain unmelted upon them during the whole summer, in ravines or other hollow places, and on declivities which incline from the mid-day sun. In the months of July and August, we still find patches of snow even down to 3,000 feet, among the central Grampians; although none may remain so late upon the more detached groups, whose summits rise much above that height.

These differences of climate are attended with corresponding differences in the botanical productions of the island. The botany of the south coast differs much from that of the north coast: many plants of the plains are unable to endure the colder and more humid climate of the mountain valleys; and on the summits of the Grampian mountains, we cannot find a tenth of the species which may be seen between their bases and the nearest sea-coasts.

Though such facts must long have been familiar to the eyes and understandings of botanists, they still remained only unconnected facts, until the present writer commenced

to arrange and generalise them, and to apply precise terms and formulas for expressing the arrangements and generalisations. So far as yet carried, the result may now easily be learned and understood, and hereafter will probably be much extended and improved upon by other parties; but the time and thought really required for collecting together and comparing the unconnected facts, in order to reduce them into some sort of orderly arrangement, can be conceived only by those who have themselves taken up a chaos of facts, and reduced them into science. This remark is not penned in silly boast, but simply in record of a single, and perhaps not very important, event in the history of British botany.

In justification of the author's right to call the past a "chaos," and his own pages an attempt to substitute science instead, he will venture on an apparent digression here; although, as the sequel may show, it is but another route to the same end—the botanical-natural divisions of Britain. "Science," writes Sir John Herschel, "is the knowledge of many, orderly and methodically digested and arranged, so as to become attainable by one." If this definition is correct,—and it has frequently been quoted with approval,—it is not the knowledge of simple facts, but their mental digestion and arrangement which constitute *science*.

Arrangement is the first effort of science. What is next required? The same philosophical writer, just quoted, immediately proceeds to define *natural science* as being the "knowledge of causes and their effects, and of the laws of nature." Now, it cannot be said that a knowledge of plants, as species, or an arrangement of them into groups of resembling species, under the designation of orders and genera, is a "knowledge of causes and their effects, and of the laws of nature." Neither can it be said that, to ascertain the areas over which species extend, and their census

or comparative frequency within those areas, is in itself any "knowledge of causes and their effects, and of the laws of nature." Information on those points is to be acquired and arranged, no doubt; and yet something more than that kind of information has still to be acquired, before we can assume to be philosopical observers of nature,—investigators of causes and effects, and of natural laws. It is in the digestion and arrangement of facts which, when so arranged, will tend to show causes and their effects and the laws of nature, that we find a close approach to natural science, as defined by the illustrious author whose words have been just quoted. Hence, the importance of tracing the distribution of plants, as influenced by physical geography, including the climate of countries. The facts of geography, and the facts of botany, are thus brought into relation, as proximate "causes and their effects;" and we get so far advanced on our way towards ascertaining those "laws of nature" which determine the floral productions of the earth, or of any portion of its surface which may be more immediately under consideration.

Still, be it remembered, we must begin with facts and the arrangement of facts, as necessary preliminaries to the investigation of causes and laws; and it is wished, in the present volume, to keep to mere facts and their methodical arrangement, as closely as the nature of the subject may allow;—causes and laws being reserved for after consideration. The nature of the facts which bear upon the arrangement of plants in *Climatic Zones*, will be made more clear, by citing some examples of those changes in the flora which are seen while descending from the summits of high mountains, into the valleys or glens below.

In July of 1832, the writer of these pages ascended to the summit of Ben-muich-dhu, the highest of the Grampian mountains, and the second (if not actually the loftiest) sum-

mit of Britain.* Unfortunately, the day proved most unpropitious for accurate observations, turning out excessively wet during the hours spent on the hill; a dense mist, equally dark as the thickest winter fog in London, enshrouded all the upper half of the mountain; and the wind was blowing vehemently over the summit, at a temperature of 39° Fahr. Thoroughly soaked with rain and snowy sleet, benumbed by the cold, and nearly blinded by wind and mist, it will excite no surprise in him, if some other botanist, ascending under more propitious circumstances, should ascertain that he failed to detect all the species on the extreme summit of the mountain, or tardily detected some of the smaller species in descending. Those phænogamic plants which he did see around the cairn on the extreme summit, were referred to the following six species; namely,—

Silene acaulis.
Carex rigida.
Festuca (vivipara?).
Luzula arcuata.
Luzula spicata.
Salix herbacea.

At a short distance from the cairn, and very little below the base, was another plant; the identity of which, with the Linnean species so named, has been lately called in question; but it is well known to British botanists, under the name—perhaps, after all, not incorrect—of

Gnaphalium supinum.

* Ben Nevis, reputed some feet higher than Ben-muich-dhu, was ascended thrice under more favourable weather; but the upper part of that mountain is so covered by enormous piles of broken rocks and stones, that plants scarce find soil wherein to fix their roots. On that hill, the comparative altitudes of species are greatly modified by the nature of the surface.

The summit of Ben-muich-dhu certainly exceeds 4,000 feet above the sea, and is commonly estimated between 4,300 and 4,400 feet. Observations taken on this unfavourable day, with Adie's sympiesometer, gave 4,320 feet for the base of the cairn which marks the summit. While descending rapidly from this cairn, all the observed phænogamic species were entered in a note-book, successively in the order in which they first came under notice. The following series of names will therefore show the relative altitude at which the several species appeared, and, of course, indicate their upper limit in the the track of descent:—

Juncus trifidus.
Vaccinium Myrtillus.
Aira (alpina ?)
Viola palustris.
Empetrum nigrum.
Alchemilla alpina.
Carex panicea.
Saxifraga stellaris.
Sibbaldia procumbens.
Rumex Acetosa.
Caltha palustris.
Vaccinium uliginosum.
Aira flexuosa.
Scirpus cæspitosus.
Eriophorum angustifolium.
Epilobium alpinum.
Rubus Chamæmorus.
Arabis petræa.
Cochlearia grœnlandica (Aut. Brit.)
Armeria maritima.
Apargia Taraxaci.
Luzula campestris.
Galium saxatile.
Anthoxanthum odoratum.
Azalea procumbens.
Calluna vulgaris (2,690 feet).

Nardus stricta.
Melampyrum pratense.
Potentilla Tormentilla.
Juniperus communis (2,660 feet).
Gnaphalium dioicum.
Hieracium alpinum.
Carex pilulifera.
Orchis maculata.
Pinguicula vulgaris.
Viola canina.
Ranunculus acris.
Euphrasia officinalis.
Vaccinium Vitis-Idæa.
Molinia cærulea.
Campanula rotundifolia.
Luzula sylvatica.
Juncus squarrosus.
Eriophorum vaginatum.
Thalictrum alpinum.
Rhinanthus Crista-galli.
Polygala vulgaris.
Arbutus Uva-ursi.
Erica Tetralix (2,370 feet).
Carex flava.
Narthecium ossifragum.
Juncus supinus.
Drosera rotundifolia.
Tofieldia palustris.
Habenaria albida.
Pedicularis sylvatica (1,838 feet).
Carex pauciflora.
Drosera anglica.
Solidago Virgaurea.
Pinus sylvestris.
Hypochœris radicata.
Genista anglica.
Erica cinerea.
Orobus tuberosus.
Myrica Gale (1,400 feet).

This list may suffice to convey some idea of the successive re-appearance of species, which a botanist has left below him in ascending to the loftier summits of the Highland mountains, and again meets on his return downwards. But in descending different hills, he will never find exactly the same order of succession. It may by observed, for example, that Vaccinium Vitis-Idæa is placed considerably below Calluna vulgaris and Juniperus communis, in the preceding list. Such, however, is not the usual position, or true upper limit of the Vitis-Idæa. On other hills, it is sometimes found above the Calluna; even on those hills, upon which the Calluna ascends several hundred feet higher than the altitude (of 2,690 feet) at which it is entered in the preceding column of names. And it is very probable that the Vaccinium Vitis-Idæa may grow much higher on some part of Ben-muich-dhu also; although it was not so observed in the line of descent, on the day referred to.

The fact of local variations in the comparative heights to which the same species ascend, will be rendered very evident by contrasting together two different descents down the same mountain. Ben-na-Bourd, a hill in the same range with Ben-na-muich-dhu, was ascended in 1832, and again in 1844. In the former year, the species observed on the broad top, or table land, of the hill were first noted; and afterwards all the other species, as successively seen in descending. In 1844, only the half-dozen species, around the cairn on the extreme summit, were first entered together in the note-book; afterwards, all the others seen in descending. In those two years, the descents were made by different sides of the mountain; though with a gradual approximation of the two courses, until both lines of descent came together at about 1,700 feet of elevation.

Summit, 1844.
(3,793 feet.)

Silene acaulis.
Carex rigida.
Festuca vivipara.
(3,780 feet).
Gnaphalium supinum.
Luzula spicata.
Juncus trifidus.
(*Descending*).
Aira flexuosa.
Alchemilla alpina.
Sibbaldia procumbens.
Viola palustris.
Aira alpina?
Salix herbacea.
Scirpus cæspitosus.
Empetrum nigrum (3,400 feet).
CALLUNA VULGARIS (3,253 feet).
Anthoxanthum odoratum.
Potentilla Tormentilla.
Ranunculus acris.
Campanula rotundifolia.
Thalictrum alpinum.
Vaccinium Myrtillus.
Azalea procumbens.
Trollius europæus (3,150 feet).
Galium saxatile.
Carex binervis.
Carex pilulifera.
Vaccinium uliginosum.
Rubus Chamæmorus.
Eriophorum angustifolium.
Saxifraga stellaris.
Epilobium alpinum.
Alopecurus alpinus (3,086 feet).
Polygonum viviparum.
Narthecium ossifragum.

Table-top, 1832.
(3,600—3,700 feet).

Silene acaulis.
Carex rigida.
Festuca vivipara.
Armeria maritima.
Gnaphalium supinum.
Luzula spicata.
Juncus trifidus.
Aira alpina?
Aira flexuosa.
Alchemilla alpina.
Salix herbacea.
Vaccinium Myrtillus.
(*Descending*).
Azalea procumbens.
Viola palustris.
Vaccinium uliginosum.
Saxifraga stellaris.
Caltha palustris.
Eriophorum angustifolium.
Scirpus cæspitosus.
Anthoxanthum odoratum.
Empetrum nigrum.
Euphrasia officinalis.
Potentilla Tormentilla.
Carex pilulifera.
Galium saxatile.
Nardus stricta.
Vaccinium Vitis-Idæa.
Narthecium ossifragum.
CALLUNA VULGARIS (3,140 feet).
Melampyrum pratense.
Orchis maculata.
Hieracium alpinum.
Luzula campestris.
Epilobium alpinum.
Rubus *Chamæmorus.*

Orchis maculata (2,870 feet).
Molinia cærulea.
Hieracium alpinum.
Hieracium nigrescens.
Apargia Taraxaci.
Luzula congesta.
Eriophorum vaginatum.
Pinguicula vulgaris.
JUNIPERUS COMMUNIS (2,665feet).
Arbutus Uva-Ursi.
Pinus sylvestris (2,370 feet).
Agrostis vulgaris.
Ranunculus Flammula.
Polygala vulgaris.
ERICA TETRALIX (2,060 feet).
GENISTA ANGLICA.
Gnaphalium dioicum.
Viola canina.
Scabiosa succisa.
Lotus corniculatus (2,000 feet).
Carex Goodenovii (1,760 feet.)*
Carduus palustris.
Digitalis purpurea.
Oxalis Acetosella.
Juncus squarrosus.
Tussilago Farfara.
Luzula sylvatica.
Arabis petræa (1,760 feet).
Juncus effusus (1,800 feet).
Betula alba (1,874 feet).
Erica cinerea (1,874 feet).
Pedicularis sylvatica.
Orobus tuberosus.
Hypochæris radicata.
Tofieldia palustris.
Trifolium repens.
Pinguicula vulgaris.
Apargia Taraxaci.
Campanula rotundifolia.
Viola canina (2,610 feet).
Carex binervis.
Alchemilla vulgaris.
Thalictrum alpinum.
JUNIPERUS COMMUNIS.
Polygala vulgaris.
Pinus sylvestris (2,230 feet).
Rumex Acetosa.
Ranunculus acris.
Leontodon palustre.
Luzula sylvatica.
Geranium sylvaticum.
Cornus suecica.
ERICA TETRALIX.
Molinia cærulea.
Salix aurita.
Juncus supinus.
Vaccinium Oxycoccos.
Arabis petræa.
Scabiosa succisa.
Anemone nemorosa.
Ranunculus Flammula.
Hypericum pulchrum.
Pedicularis sylvatica.
Gnaphalium dioicum.
Salix fusca.
Thymus Serpyllum.
Solidago virgaurea.
Betula nana (1,945 feet).
Vicia sepium.
Rubus Idæus.
Digitalis purpurea.
Juncus effusus.

* A small ravine was crossed here, which will account for the lower elevation between 2,000 and 1,874 feet.

Prunella vulgaris.	GENISTA ANGLICA.
Salix fusca.	Spartium scoparium (1,982 feet).
Bellis perennis.	Betula alba.
Veronica officinalis.	Carex pallescens.
Carex stellulata.	Carduus palustris.
Juncus supinus.	Stellaria holostea.
Solidago virgaurea.	Veronica officinalis.
Linum catharticum.	Trientalis europæa.
Lysimachia nemorum.	Hypochæris radicata.
Fragaria vesca.	Trifolium repens.
PTERIS AQUILINA (1470 feet).	PTERIS AQUILINA.
Epilobium alsinifolium.	Galium verum.
MYRICA GALE (1,350 feet).	Epilobium angustifolium.
Populus tremula.	Veronica Chamædrys.
Gentiana campestris.	Rosa spinosissima.
Aira caryophyllea.	Aira caryophyllea.
Rosa spinosissima (1,300 feet).	MYRICA GALE (1346 feet).

On comparing these two lists together, it will be seen that there is a considerable approximation towards a correspondence between the two series of names; although they do not succeed each other with exactness or complete uniformity. In both lists the Calluna stands above the Juniperus; in turn, the latter is above Erica Tetralix; the Erica is placed above Genista anglica; and the Genista is above Pteris aquilina or Myrica Gale. In addition to this general correspondence, in the heights attained by one species compared with others, there is also an approximation towards agreement in the absolute altitudes to which they ascend on different aspects of the same mountain.

If the reader will now look back to the list of species noted in the descent from Ben-na-muich-dhu, he will see precisely the same order of sequence in the names of the shrubs distinguished by capital letters. At the same time, he will observe some wide variations between their absolute altitudes. The Juniperus and Myrica are noted at nearly

equal heights in all three lists; but the Calluna is much lower, and the Erica much higher, on Ben-na-muich-dhu. Such differences appeared explicable enough on the spot, by attending to the physical conditions of the ground; but these conditions will not be discussed here, because attention is at present desired to the simple facts, and not to the causes or explanations of any want of strict uniformity between them.

Similar lists to the preceding have been made by the present writer, on many other hills in Scotland; as also on some of those in England and Wales. On comparing these numerous lists together, a strong general correspondence can be traced among them. Always, where the hills have been left most nearly in a state of nature, the Calluna is found growing to greater elevations than the Erica Tetralix; and the Erica as invariably rises higher than the Myrica Gale. Moreover, in the great majority of instances, the species which grow above the Calluna on one hill, are the same which grow above it on the others; for example, Luzula spicata and Gnaphalium supinum in the preceding lists. The like correspondence may be observed, on different hills, between the species which grow above the Erica, and cease below the termination of the Calluna; as is the case with Juniperus communis in the three preceding lists. Still the same fact prevails, if we compare the species whose upper limit occurs between those of the Erica and Myrica. As might be expected, the absolute altitudes attained by the same species vary very much in different parts of Britain; but the relative altitudes of the more generally distributed species, one being compared with another, remain far more uniform.

The Ascending or Climatic Zones of Plants are founded upon this prevailing uniformity. Certain species are selected, the presence or absence of which can be taken as a

character of the Zone; and the upper and lower limits of all the other species may then be expressed by reference to the Zones in which they are found.

In selecting the species for this object, preference should be given to those which are generally and abundantly distributed, sufficiently conspicuous not to be easily overlooked, and the limits of which remain most uniform with respect to each other. The commoner arborescent species (Pinus, Betula, Alnus, Quercus, &c.) would best meet the required conditions, were it not for the interfering operations of mankind; whose own agency, rather than the hand of nature, now assigns limits to the distribution of trees. In the low country, which is subjected to the plough and scythe, and mapped over with planted hedgerows, trees can scarcely be pronounced really indigenous; and on the mountains and moors, they are often destroyed by fire, applied at short intervals, for burning off the natural vegetation, in order to substitute a pasturage better adapted for sheep-feeding. Some of the Ericaceæ, conspicuous by their size and abundance, are so well fitted to flourish on the wastes of nature, that they rapidly resume possession of the surface, after each burning; and these accordingly will afford better characters for the indication of ascending Zones, above the limit of cultivated ground.

Before proceeding to define our Climatic or Ascending Zones, the true meaning and use of such divisions of the surface should be clearly understood. They are arbitrary and conventional sections, in so far as the selected species and fixed lines of demarcation are concerned; and yet they do correspond with and represent differences which actually exist in nature; inasmuch as the vegetation of each single Zone differs considerably from that of the other Zones above or below. In truth, however, the natural changes of vegetation being everywhere gradual, any *line* will in-

evitably sever and divide that which is nearly alike; the vegetation being more similar on the contrary sides of any one dividing line, than it is on the two sides of the broad zone between any two lines. This disadvantage attends all our arrangements and groupings of nature's realities. We see it in the grouping of plants into orders and genera; we see it in grouping them together according to their provinces and counties; we see it in arranging them under climatic zones. But this disadvantage is still far outbalanced by the practical convenience of such groupings and arrangements, in the acquisition and communication of knowledge. The human mind cannot grasp all nature at once, either as one great whole, or in its innumerable details. The great unit must be divided into parts; the details must be combined into groups; without our losing sight of the truth, that all these parts or groups do gradually unite and merge into each other.

It will be recollected also that climatic or ascending zones of plants are designed to indicate the relative distributions of species under the joint influence of altitude and latitude, with other conditions of a more local character, such as proximity to seas or mountains, the state of exposure or shelter, &c. Connexions may be traced between the distribution of plants, and each of these conditions singly; but everywhere the influence of any one condition is more or less disturbed and modified by that of others. Their effect upon the flora or general vegetation is mostly indirect or remote; that is, the flora varies with the climate, and the climate varies with altitude, latitude, and other conditions of place and surface. On a single isolated mountain the ascending zones of vegetation are very strongly marked, in accordance with latitude; some species disappearing, other species appearing, one above another, as we

gradually ascend from base to summit. Yet on a single mountain, as we have seen, local changes in the character of its surface, and the difference of aspect on its declivities, will disturb the regularity of its ascending zones. On an extended range of mountains the disturbing effect of local peculiarities will become much more obvious. And when we have to adapt our zones to several groups of mountains, dissimilar in extent, elevation, latitude, maritime proximity, and other circumstances, it then becomes difficult to define them with any exactness. This difficulty is experienced in tracing the ascending zones of plants in Britain. The absolute elevation, at which the same species will grow, varies by many hundred feet on different mountains. And as this variation is by no means uniform with different species, we find local changes in their relative elevation also, the limit of one being compared with the limit of another. Notwithstanding such local exceptions, however, the general rule will be found true, that *a species which rises higher than another on one range of mountains, will usually be found higher on other ranges;* and the commoner the species, the more exact is the rule found to be.

As before explained, it is upon the prevailing regularity of this fact or rule, that the climatic zones of plants are founded and defined; the presence or absence of some common and conspicuous species being made the test of the zone. The primary division which is here to be proposed, as one best applicable in Britain, is ostensibly founded upon an artificial character; namely, the presence or absence of cultivation. It is by this character that we may distinguish the lower from the upper zones of plants; giving to the former the common designation of *Agrarian*, and calling the latter by the name of *Arctic* zones. Or, to

prevent confusion with subordinate divisions, it may be well to say, in the first instance, *Agrarian Region* and *Arctic Region*.

In the spontaneous vegetation of Britain, we can find no character equally obvious and general with that afforded by the cultivation of grain. The interests of mankind are so intimately connected with the production of corn, that we shall everywhere find cultivated fields as far up the valleys and acclivities of the mountains, as their climate will allow. No doubt we may see many spots where the nature of the soil or surface, rather than the climate, forbids success in cultivation. But a correct observer can scarcely be misled in such instances, since he will usually find cultivation sufficiently near these spots, to show that it has not been prevented by inferiority of climate. Moreover, nature will afford us a second test of the Agrarian region, by the presence of a very common and conspicuous fern, the Pteris aquilina. This fern is distributed throughout the region, and from one extremity of our island to the other; its upper limit usually running nearly uniform with the climatic limit of corn cultivation; so that the two characters in connexion form a satisfactory test of the region. The plough is soon fatal to the Pteris, nor can it long resist the annual attack of the scythe in early summer; but we require its presence, as a character, only in those spots which remain uninvaded by scythe or ploughshare; and in such spots we seldom seek it in vain, until arriving about the line where climate itself arrests the ascent of agriculture.

Among the Highland mountains, the highest spot at which the cultivation of grain has been observed by the writer of these pages, was at the outlet of Loch Callater, estimated to be 1,600 feet above the sea. Potatoes can scarcely be grown in Drumochter Pass, which is calculated at 1,530 feet above the sea, and is much more shadowed by

mountains, than is the outlet of Loch Callater. From 1,000 to 1,200 feet is more frequently the actual limit of corn and potatoes in the Highland counties. In one sheltered spot, in the woods of Lochnagar, the Pteris was observed at 1,900 feet; and in another part of the same woods at 1,700 feet. On exposed moors, in the Highlands generally, it is very seldom seen above 1,200 feet, unless in hollow depressions or on those declivities which front to the sun. On open moors the Myrica Gale will rise higher than the Pteris; having been seen at 1,700 feet on a bleak exposure in the forest of Drumochter, which forms a part of the northern declivity of the central Grampians, and is stamped by the impoverished or arctic character of its vegetation at comparatively moderate altitudes. More frequently the Myrica ceases at 1,400 or 1,500 feet. Upon these two regional divisions, we may found an arrangement of species into three climatic groups, thus:—

Arctics,—found only in the arctic region.

Arctic-Agrarians,—found in both regions.

Agrarians,—found only in the agrarian region.

But the objects of botanical geography will frequently require such a sub-division of these two regions, as will enable us more exactly to express the *range* of climatic distribution for each species. For instance, the Clematis Vitalba and Ulex europæus are alike limited to the agrarian region, and yet their climatic ranges are very unequal. The Clematis can scarcely be deemed native in this country farther north than latitude 53, while the Ulex is certainly native beyond 56, if not beyond 58 of latitude. And in respect of elevation, the Ulex will rise to thrice the altitude at which the Clematis ceases to grow. Equivalent differences occur between the range of climate for the Arctics, as also for the Arctic-Agrarians. Genista anglica, Calluna vulgaris, and Vaccinium Myrtillus will afford striking ex-

amples. These three shrubs are distributed through Britain, from the Peninsula to the North Highland province; the two latter extending into Shetland; and all three ascending the Highland mountains above the limit of cultivation. But they ascend to unequal altitudes, for (in round numbers) the Vaccinium grows even at 4,000 feet of elevation, while the Calluna fails at 3,000, and the Genista at 2,000.

As a mode of indicating the climatic range of species rather more precisely than can be done under two regional divisions only, it is expedient to sub-divide the regions each into three subordinate zones. But in attempting this sub-division, the practical difficulty before adverted to (pp. 30-31) comes in the way of any rigidly precise definition. On a single conical mountain of some thousands of feet in elevation, it might be easy to distinguish six zones, or even six times six zones, by the successive terminations of different species. But when this is tried on different mountains, local variations present themselves in the comparative limits of species, such as are shown in the examples before given (pp. 26-28). The local variations are always found to become more wide and numerous, as the mountains are distant from each other, and dissimilar in their physical characters and geographical position. Within the the length of Britain, we have several distinct groups of mountains, differing among themselves very widely in respect of latitude, of maritime proximity, of elevation, of geological character and other conditions. Accordingly, our six zonal sub-divisions will present many local differences in the species which constitute their respective floras; and even where the same species are repeated in the same zones on different mountains, as will more usually be the case, their limits will often differ somewhat relatively to each other. It is necessary for the student in botanical

geography to bear this in recollection; otherwise, the zonal or climatic distribution of plants will appear a chaos of confusion and contradictions, instead of being one of the most interesting and instructive inquiries with which a botanist of philosophical turn of mind can engage himself.

The ARCTIC REGION is conveniently sub-divided into its three zones by the terminal lines of Erica Tetralix and Calluna vulgaris; the middle zone being that space which is situate above the limit of the Erica, and is still within or below that of the Calluna. To keep up some uniformity of terms, as more easily remembered, the three zones of the arctic region may be appropriately designated the *Super-arctic*, *Mid-arctic*, and *Infer-arctic zones*. The test derived from the presence or absence of the two shrubs mentioned, is more obvious and easily applied in the Highland provinces, than is the case in those more southward, where the Ericaceous shrubs are more frequently or more completely destroyed by the fire-brand of the farmer and shepherd. But with the descriptions and explanations to be given in an after part of this work, the three arctic zones will be rendered sufficiently clear and certain.

It is in the mid-arctic zone, as will be then more fully shown, that collecting botanists find most of the rare alpine plants which they so much delight in procuring; and to collect which, is the sole object of nineteen out of twenty botanists who ascend the mountains. In this zone, for example, grow Saxifraga nivalis, Gentiana nivalis, Erigeron alpinus, Astragalus alpinus, Veronica alpina, Alopecurus alpinus, &c. &c. Several of these plants rise also into the super-arctic zone; to which some few others are perhaps wholly limited, as Saxifraga cernua and Saxifraga rivularis. Many of the more ordinary alpine plants occur in all the three arctic zones, and descend also some distance within the agrarian region; for example, Thalictrum alpinum,

Alchemilla alpina, Saxifraga stellaris, Oxyria reniformis, Polygonum viviparum, &c. &c.

The question may hence be asked by readers, 'why the term *arctic* is now employed for the regions and zones, instead of the more familiar term *alpine;* this latter designation having been adopted in the author's earlier writings on the distribution of plants?' Two considerations induce to the change of term. First, the word *alpine* is in common use to express mountain plants, without reference to their positions above or within the limits of cultivation; and it has thus a different and less precise signification than the word *arctic*, as here applied and restricted. Secondly, the flora of all our mountains, above the limit of cultivation, has much closer affinity with that seen northward of the British islands, than it has with that of the Alps of middle Europe: it is, for example, much more like the flora of Lapland than the flora of Switzerland.

We have next to sub-divide the AGRARIAN REGION into zones; and for these also we may use the same terms as before, prefixed to the name of the region, and say an *Infer-agrarian, Mid-agrarian,* and *Super-agrarian zone.* But it will be found impracticable to define and distinguish these agrarian zones by the presence or absence of single species, as may usually be done in the arctic zones. Comparing a flora of one of the south-eastern provinces of England with a flora of the Highland valleys, or of the plains near the north coast of Scotland, the dissimilarities would be found strongly marked, both in the species and in their comparative numbers; and an intermediate tract, between these two extremities of the agrarian region, would be sufficiently well characterised by its own distinctive features, taken in the aggregate. The difficulty is always renewed when we endeavour to divide natural gradations by abrupt lines, and to lay down distinctions which rest

upon single characteristics. Keeping this in view, the three zones may be shortly explained here, and the more complete descriptions be afterwards given.

The *Super-agrarian zone* may be said to comprise three portions of the surface of Britain. First, all the coast-line and low plains or moors in the north and north-west of Scotland, where we find plants of an alpine character descending even to the sea-shore; such as Thalictrum alpinum, Draba incana, Saxifraga oppositifolia, Arbutus alpina and Dryas octopetala. Secondly, all other spaces, in any part of Britain, where the elevation of the ground leads to the production of the same or usually associated species; Arbutus Uva-Ursi, Saxifraga stellaris, Alchemilla alpina, Tofieldia palustris and Juncus triglumis being examples of the latter. Thirdly, those tracts of slight elevation, upon which a corresponding flora and general vegetation prevail, apparently in consequence of mere proximity to high mountains; Saxifraga aizoides growing so low as 300 feet among the mountains of Cumberland, and Epilobium alsinifolium at 500 or 600 feet in Caernarvonshire; although these plants are never seen at such a low elevation in England, remote from the higher hills. In addition to these species, derived from the arctic region, this upper zone of the agrarian region is characterised (in descending) by the appearance of Ilex, Corylus, Quercus, Fraxinus, Lonicera, Cratægus and fruticose Rubi; equally so, likewise, by the absence of other species which are not seen until we descend into the next lower zone.

The *Mid-agrarian zone* will comprehend all the low grounds, clear from the mountains, which are situate between the estuaries of the Clyde and Tay, on the north, and those of the Humber and Dee, on the south; also, probably, a narrow coast-line of the East Highlands, extending from Perth to Aberdeen, and, possibly, even to

Inverness. To this space we must likewise add a narrow belt winding around the hills of Wales, and characterised by the vegetation of the present zone, rather than that of the zones above or below this intermediate one. Descending from the super-agrarian into the present zone, we find some of its characteristics in the first appearance of Convolvulus sepium, Bryonia dioica, Tamus communis, Acer campestre, Rhamnus Frangula, Rhamnus catharticus, Ulex nanus, Viburnum Lantana, Euonymus europæus and Cornus sanguinea; all of which also occur in the lowest zone, though none of them are ascertained to be truly native in the upper portion of the agrarian region. Unlike the mid-arctic zone, the present includes few or no species which can be deemed entirely restricted to it. In common with the zones above, it possesses Trollius europæus, Geranium sylvaticum, Habenaria albida, Rubus saxatilis and some other species, which are very rare, if not wholly wanting, in the zone below.

The *Infer-agrarian zone* will embrace all the country southward from the Dee and Humber (continued into the river Trent), excepting the mountainous tracts of Wales and the higher hills and moors in the provinces of the Severn and Peninsula. This zone is more particularly characterised by the increased abundance of the species already mentioned as commencing in the zone above. Among the species absolutely restricted to it, as native plants, the Clematis Vitalba is one of the most conspicuous and ornamental. Rubia peregrina is another characteristic species, prevalent in the southern and western counties; while the Clematis delights in the calcareous tracts of the southern, eastern, and inland counties. Several species are quite peculiar to this lowest, or most southern, of the six zones; but for the most part, they are too scarce or local

to be received as characteristic. Examples occur in Erica ciliaris, Sibthorpia europæa, Cyperus longus and Scilla autumnalis.

The six climatic zones, into which the two regions are thus sub-divided, may be better understood and remembered after being presented to the eye in connexion with each other. The Nos. are reversed, because it is more convenient to trace them upwards, from south to north, from low to high ground:—

II. Arctic Region.

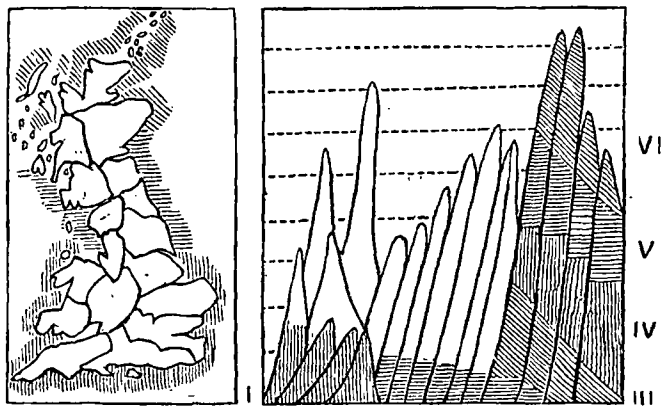
6. Super-arctic zone—Salix herbacea, without Calluna.
5. Mid-arctic zone—Calluna vulgaris, without Erica.
4. Infer-arctic zone—Erica Tetralix, without Pteris.

I. Agrarian Region.

3. Super-agrarian zone—Pteris aquilina, without Rhamnus, &c.
2. Mid-agrarian zone—Rhamnus catharticus, without Clematis.
1. Infer-agrarian zone—Clematis, Rubia, Cyperus longus.

Unless the highest part of Snowdon can be deemed to attain the super-arctic zone, none of the before-explained provinces will include the full series of six zones. Elsewhere the hills are not sufficiently lofty to pass the mid-arctic zone, until we arrive at the Highland provinces, all three of which have their highest summits clearly above the limits of the Calluna; but the lowest portions of these provinces, near their coast-line and southern boundary, fall barely within the mid-agrarian zone. The six various shadings in the annexed diagram (repeated from page 14) will indicate the succession of zones; their true limits, relatively to altitude, being yet unascertained in most of the provinces. The little map is on too small a scale for the

zones to be accurately traced within it; but the external shadings will show the three agrarian zones on the coast-line.



It is probable that six such zones are quite as many as can be satisfactorily distinguished when attention must be directed to the whole surface of Britain. Even with six only, it would be useless to attempt very great precision in assigning the species to their respective zones. We must disregard the occasional and slight tresspass of a species into a zone above or beneath those to which it is otherwise restricted by its natural adaptation to their climate. Such trespasses (if the expression be allowable) are usually found in connexion with some local peculiarity by which the true climate is varied, or its influence on the plants modified. For example, the cool spray of a water-fall, or the efflux of a cold spring, will support the species of a colder climate than is natural to the latitude and elevation. And, on the contrary, the plants of a warmer climate will grow on the south face of rocks which are raised above the altitude where the same species cease to exist in more bleak situations. These apparent exceptions come inconveniently in the way of precise lines on botanico-geo-

graphical maps. Though such lines may be made to look very clear and satisfactory upon paper, nature refuses to trace them on her own domains.

To take an example:—Gnaphalium supinum (of British authors) has been seen at the level of a corn-field by Loch Callater (1,600 feet) in Aberdeenshire, and Pteris aquilina has been found much above the same altitude, at the distance of half a dozen miles; namely, at 1,700 and 1,900 feet. Yet in ascending the gradual declivities of the same mountains, under equal conditions of surface and shelter, the Pteris always ceases before we attain the altitude at which the Gnaphalium commences. On this account, they are assigned to different zones, although their limits can thus cross in respect of absolute elevation. They belong to different climates, and are so placed by nature when under equal conditions of exposure, &c. So, again, a bush of Corylus Avellana has existed during many years against the sunny face of a steep rock on the Clova Mountains, at nearly 2,000 feet of elevation; rather below which, and at a slight distance, some weakly plants of Saxifraga nivalis have been observed. Nevertheless, this solitary instance cannot warrant the assignment of these two species to the same zone; because the upper-line of the Corylus is usually 500 to 1,000 feet below the lower-line of Saxifraga nivalis. In studying the climatic affinities of plants, we must reason as well as observe, and estimate as well as measure.

Though examples of each may thus occur, it is more usual to find "tresspasses" downwards than upwards. The descending course of water conduces much to this result in the mountain districts, not only by bringing down the seeds of plants from the higher zones, but also by bringing down the cold of the mountains; so that the first appearance of alpine species, as we ascend the mountains, is usually by the side of the water-courses, or upon wet rocks which are

kept cool by the dripping and oozing of water. In such situations, Silene acaulis may be found a thousand feet lower than it is seen as a constituent of the drier and sun-exposed sward. And there is also another circumstance which makes the lower limits appear more irregular and exceptional than the upper; namely, the fact that mountain species will re-appear on maritime cliffs, although absent from the open plains and low hills between the coast and the mountains. Thus, on the southern acclivities of the Grampian mountains, Saxifraga oppositifolia is seldom seen below a thousand feet of elevation; although still farther south, it was found on the west-coast of Scotland, by Professor Balfour, very little above the sea-level. On the coast, consequently, this "alpine plant" intermingles with species which never occur at alpine elevations on the mountains.

In addition to their distribution by provinces and climatic zones, there is a third mode of indicating the geographical relations of plants, which may also require some explanation. It has been before observed that certain species are spread over the whole island, while others are limited to one, two, three or more of the provinces. The same holds true in the zones; some species occurring in all of them, others in one or more. Perhaps no two species have exactly the same distribution or relative frequency; and yet certain general similarities may be traced, by which the species may be grouped together under a few leading *Types of distribution*. In the small volume before alluded to, by the title of 'Remarks,' certain "geographic types" were indicated (pp. 86—89); and in the 'Tabular Appendix' to the same volume (115—184) the species were severally assigned to their peculiar types. This was simply an attempt to express, by a single term, the leading character of their distribution, with reference to geographical position

and climate. Six types of distribution were particularly mentioned; under one or other of which, it was thought, nearly all the species of plants indigenous in Britain might respectively be arranged. No attempt, however, was made to define the precise limits of the types geographically. Nor, indeed, could any exact boundary lines be traced on a map, without abruptly cutting asunder the fine gradations of Nature; for the types pass into each other without any hard or abrupt lines of distinction. In slightly describing the several types, in the former volume, a different order of succession was adopted, and consequently the nos. affixed to them were different also; but in other respects they were essentially the same as the following:—

1. *The British Type.* — In this group will be included those species which are found in all, or nearly all, of the eighteen provinces before explained; and which, moreover, are not so exclusively prevalent or predominant in any particular portion of the island, as to bring them clearly within one or other of the following types. Some of the species may be regarded as of universal occurrence in this country, growing in all the eighteen provinces, probably in every county, and even in all the six ascending zones of vegetation or climate also. Few species, however, even of this most general type, are so very general in their distribution. By far the larger portion of species have a restricted zonal range. Many, too, which are general with reference to the provinces, are absent from some of the counties. And a considerable number of species which are too widely and abundantly distributed to allow of their being placed under any of the other types, are yet rare or wholly wanting in one or more of the provinces; particularly in the northerly provinces of Scotland, and more especially in that of the North Isles, which has

a very scanty flora. The species which are thus characterized by their general presence and prevalence, or rare only in those tracts which are seldom visited by botanists, become familiarly known and contemned under the designation of "common things;" and being much neglected, in consequence, it has often been found difficult to ascertain their true distribution and comparative frequency, on recorded evidence. It is to be observed, that the name of 'British type' is applied to them, not on any hypothetical notions of their origin within Britain, but because such a general distribution and prevalence indicates great adaptation to the climate and other local conditions of this country, and entitles them to be considered thoroughly native both in England and Scotland—to be Britons in the fullest signification of the term. It is probable that about two-fifths of the whole number of British species (including 'natives,' 'denizens,' 'colonists,' as presently to be explained) will be referred to this, the most general type of distribution; although, at present, the number cannot be exactly stated. Among the more thorough examples of the type may be instanced the following, namely, Alnus glutinosa, Betula alba, Corylus Avellana, Salix capræa, Rosa canina, Lonicera Periclymenum, Hedera Helix, Cytisus scoparius, Calluna vulgaris, Ranunculus acris, Cerastium viscosum, Potentilla Tormentilla, Trifolium repens, Stellaria media, Lotus corniculatus, Bellis perennis, Senecio vulgaris, Carduus palustris, Taraxacum officinale, Myosotis arvensis, Prunella vulgaris, Plantago lanceolata, Polygonum aviculare, Urtica dioica, Potamogeton natans, Lemna minor, Juncus effusus, Carex panicea, Poa annua, Festuca ovina, Anthoxanthum odoratum, Pteris aquilina, Polypodium vulgare, Lastræa Filix-mas.

2. *The English Type.* — The plants of this geographic type are distinguished from those of the British type by having their chief prevalence in England, and particularly in its more southern provinces; whence they gradually become rare in a northern direction, and finally (with few peculiar exceptions) find an earlier northern limit or cessation than those of the preceding type. Their terminal lines are very different among themselves; some of the species being entirely limited to two or three of the most southern provinces of England; while other species occur in all the provinces of Britain, with an exception of two or three of the most northern; the great majority having their limits between these two extremes. Those species which extend into nearly all the provinces, except two or three of the northern, approximate very closely to the less general examples of the British type; and, in fact, there are cases where it becomes almost optional whether the species are to be referred to the one or to the other type. To the characters of diminished frequency and earlier northern termination, which distinguish the species of the English from those of the British type, must be added that of spreading into both the eastern and the western provinces of England, and without any very striking difference of comparative frequency towards the two sides of the island, beyond that which may be caused by the repellent influence of the western mountains, which necessarily tend to banish such species as are naturally adapted to low situations, in a warmer and drier climate than that of our mountainous tracts. The name of 'English Type' will not be misunderstood to indicate that all the species are peculiar to England, but is to be understood only as implying that the species are apparently adapted to the climate of England, either being restricted to that part of Britain, or being more prevalent there than

in Scotland. As a temporary estimate, we may reckon the species of the English type at about one-fifth of the whole flora of Britain. Cyperus longus and Cicendia filiformis are very local examples of this type, if, indeed, they can be fairly referred to it; being restricted to a few counties southward of the Thames and Bristol Channel. On the other hand, Malva moschata and Poterium Sanguisorba approximate to the British type in being distributed from the south coast of England up to the middle of Scotland. More characteristic examples of the English type of distribution may be cited in Rhamnus catharticus, Ulex nanus, Tamus communis, Bryonia dioica, Hottonia palustris, Chlora perfoliata, Sison Amomum, Moenchia erecta, Linaria Elatine, Ranunculus parviflorus, Lamium Galeobdolon, Hordeum pratense, Alopecurus agrestis, Ceterach officinarum.

3. *The Scottish Type.*—This may be deemed the opposite of the English type; the distribution of the species referred hereto being characterized by a northern tendency, either by absolute limitation to Scotland or the north of England, or otherwise by a chief prevalence there and increased rarity southward. Parallel with some of the species referred to the English type, so some of those referred to this present one are quite restricted to two or three of the most northern provinces of Scotland; while others abound in Scotland, and also spread southward, although in diminished frequency, far down England; others, again, finding their southern limits between the extremes of narrow and wide distribution. With respect to those species which are most widely distributed, their diminished frequency, or entire absence in the southerly provinces, applies more particularly to the south-east of England, where the climate is drier, and the summer temperature is higher than usually experienced in the south-western pro-

vinces of England. Along with this group, also, may be associated certain species which run out to diminished frequency, or early absolute cessation, northward as well as southward; occurring chiefly or only in the northern provinces of England and southern provinces of Scotland. Equally with the rest, these are truly plants of a boreal distribution and prevalence, when we consider them with reference to the southern provinces of England; although it may also be said that they are so far species of a southern distribution likewise, when considered with reference to the northern provinces of Scotland. From other species of the Scottish type, however, they differ chiefly by their more restricted areas; for their tendency to the hilly districts of England and the Lowlands, like those which extend still farther northward in Scotland, indicates a general similarity of climatal adaptation, while it strongly distinguishes them from species of the truly English type. It will thus be understood that several of the species assigned to the Scottish type of distribution are not prevalent only in Scotland; some of them, indeed, being more prevalent in the northern provinces of England. But since the majority are prevalent in Scotland, the name of the type is taken from that northern portion of the kingdom, as a sufficient contrast to the name adopted for the more southern or English type. Perhaps not more than a twentieth of the whole number of British plants will come under the Scottish type. Primula scotica and Ajuga pyramidalis are instances of an extremely restricted and boreal area. Goodyera repens and Corallorhiza innata are also very partial, though less thoroughly boreal with us. Primula farinosa and Saxifraga Hirculus may be instanced as examples of that division of the Scottish group which is characterized by a comparatively early limit northward. But more characteristic examples of the Scottish type

may be mentioned in Empetrum nigrum, Rubus saxatilis, Trollius europæus, Geranium sylvaticum, Trientalis europæa, Habenaria albida, Ligusticum scoticum and Lithospermum maritimum.

4. *Highland Type.*—This may be considered the boreal flora in a more intense degree, as respects climate, than that of the Scottish type. The species referred hereto are distinguished from those of the Scottish type by being more especially limited to the mountains or their immediate vicinity. Some of them are wholly confined to the higher mountains, and never descend within the agrarian region; these being the 'arctics' before mentioned on page 54. Others, though prevalent on the mountains, do descend also into their glens and valleys quite within the agrarian region. And others, again, may occasionally be seen outside the mountainous tracts, particularly along the course of rivers which have their sources among the mountains, or even upon the rocks of the sea-coast. As a group, these species are either restricted to the mountains or very decidedly more prevalent there. Several of them, more especially the true arctics, are strictly peculiar to the Highland mountains; while others occur also on the mountains of England and Wales, though less plentifully than in the Highlands of Scotland. The name chosen for the type intimates their most appropriate habitat, although some of them do likewise find a suitable climate on the mountains of England or Wales. It is probable that the Highland type will comprehend about a fifteenth of the whole flora of Britain; its species scarcely reaching a hundred. But if we should unite the Highland and Scottish types, as one boreal type in contrast against the austral or English, they would together constitute about an eighth of the species now fairly wild in Britain. As examples of thoroughly Highland species, such as do not

occur in any province southward of the Highlands, we may cite Azalea procumbens, Cherleria sedoides, Veronica alpina, Alopecurus alpinus, Phleum alpinum, Juncus trifidus, Sibbaldia procumbens, Erigeron alpinus, and Gentiana nivalis. And as examples of other species which occur likewise on the more southern mountains, and mostly descend lower on those of the Highland provinces, we may enumerate Salix herbacea, Silene acaulis, Saxifraga stellaris, Oxyria reniformis, Thalictrum alpinum, Luzula spicata, Juncus triglumis, Rubus Chamæmorus, Epilobium alsinifolium, Draba incana, Dryas octopetala, and Alchemilla alpina.

5. *The Germanic Type.* — The distribution of several species which might otherwise be associated with those of the English type, is peculiarly characterized by a tendency to the eastern side of the island. Some few of these are absolutely restricted to the south-eastern provinces of England, — Channel, Thames, Ouse, one or more; while others of them extend farther northward or westward, yet decidedly diminishing in abundance in either direction. As the cretaceous deposits lie almost solely in the eastern and south-eastern provinces of England, the "chalk plants" are included with the others referred to the present type; although, it is to be recollected, that the type is primarily founded upon botanico-geographical peculiarities, and not upon any geological characters. Some of the eastern species extend even into Scotland; but, for the most part, they are the species of England only. The name of 'Germanic' type is not applied with reference to any supposed origin from Germany, but simply as indicating the tendency of the species to a distribution connected with those provinces of England which are bounded by the German or North Sea eastward, including the Straits of Dover and upper part of the English Channel; for the

species of this present, and those of the next type, more or less intermingle in the counties of the English Channel. The species which can be assigned to this type may run between a fifteenth and a twentieth of those which are reputed to be indigenous in Britain; the number varying according to the degree of decrease westward which may be deemed sufficient to warrant the assignment of species to the present rather than to the English type. Among the examples of the type may be instanced the following; namely, Frankenia lævis, Anemone Pulsatilla, Reseda lutea, Silene noctiflora, Silene conica, Bupleurum tenuissimum, Pimpinella magna, Pulicaria vulgaris, Lactuca Scariola, Atriplex pedunculata, Aceras anthropophora, Ophrys aranifera, and Spartina stricta.

6. *The Atlantic Type.* — Contrary to the peculiarity of distribution which constitutes the Germanic type, there is in that of other species a marked tendency towards the western and south-western coasts or counties. Some few species are absolutely restricted to the single province of the Peninsula. Others occur also in one or more of the adjacent provinces. And others, again, run far up the western coasts in a northerly direction, often plentifully there, and yet occur very rarely, or not at all, towards the eastern coasts of the island. These species, although thus dissimilar in respect of their area and census, correspond in the one circumstance of having some decided tendency to the western or Atlantic side of the island, in contradistinction to the eastern or Germanic side. Although there may exist other reasons for specially denominating some of these the "Atlantic species," the name of the type will be here understood as having reference only to their distribution within Britain itself, and by itself. About the same number of species are likely to be referred to this type, as to the Germanic; its arithmetical value being

somewhere between a fifteenth and a twentieth part of the flora of Britain. As examples, we have Sinapis monensis, Matthiola sinuata, Raphanus maritimus, Sedum anglicum, Cotyledon Umbilicus, Bartsia viscosa, Pinguicula lusitanica, Euphorbia Peplis, Euphorbia Portlandica, Scirpus Savii, — which occur in several counties; also Sibthorpia europæa, Erica vagans, Erica ciliaris, Physospermum cornubiense, Polycarpon tetraphyllum, Adiantum Capillus-Veneris, Cynodon Dactylon, and others which occur in very few or only single counties. On pages 9 and 12, Cynodon Dactylon is inadvertently said to be found only in Cornwall; that name having been overlooked in Dr. Salter's list of plants near Poole, in Dorset: a consequence of its alphabetical series of names, which renders comparisons with scientifically arranged lists so exceedingly troublesome.

7. *A Local or doubtful Type.* — Interspersed about the island, there are some species whose distribution is restricted to single or few counties. Such species can seldom show that decided tendency to the east or the west, to the south or the north, to the mountains or otherwise, which would fully warrant their assignment to any one of the six preceding types of distribution. In those instances where the single or few localities occur clearly and solely within the geographic limits of one of the types, the plants will usually be associated with the group to which they thus make the nearest approach. For instance, there can be no hesitation in assigning the extremely local Lychnis alpina and Oxytropis campestris to the Highland type; and not much more doubt can arise respecting the propriety of placing Arenaria norvegica and Primula scotica in the Scottish type. So also, the local Cicendia filiformis may go to the English type; Veronica verna, to the Germanic type; Erica vagans, to the Atlantic type. But after

thus disposing of a large portion of these local species, there are still some others left on hand, which cannot be so fairly assigned to any of our six principal types. Potentilla rupestris and Anthericum serotinum, for instance, are peculiar to single mountains in North Wales. As local western species they might be associated with the Atlantic type; but the hilly and inland nature of their localities, and their absence from the provinces of South Wales and the Peninsula, come inconveniently in conflict with the chief characters of the Atlantic type. Draba aizoides and Cotoneaster vulgaris, found on the rocky coasts of Wales very locally, approximate rather nearer to that type, and might be associated under it, in so far as Britain is concerned; and yet, if we should extend our views, so as to take in their distribution upon the continent of Europe, this would be found a misposition. Some other less local species have also a distribution which does not correspond with that of any of the six types specified; their localities being restricted to calcareous rocks, and occurring in such positions as not to place them properly under one of those types. Examples may be mentioned in Draba muralis and Hutchinsia petræa, the distribution of which is strictly neither eastern nor western, northern nor southern; and, though they are in some degree hill plants, yet they are certainly not Highland species; while their very limited area separates them as clearly from the British or general type. Eriocaulon septangulare is another anomaly, which was associated with some very few other species into the 'Hebridean type' of the former work. But as these few did not make a congruous group, and were numerically too insignificant to be set up against those of the other six types, the Hebridean is here discarded, and its half-dozen species divided between the Scottish and Local types.

As with the ascending zones, it may be remarked also of the types, that no decided lines of separation can be drawn between them. They may be said to pass gradually into each other; because the distribution of some species is of such an intermediate character as to render the choice of type to express it either dubious or optional. Many species assigned to the British type, by becoming less plentiful towards the northern or southern extremities of the island, will thus pass into the English or Scottish types. In like manner, those of the English type pass into the Germanic or Atlantic. And between the Highland and Scottish types the distinction is occasionally very slight indeed. Still, in a general sense, these geographic types do represent the realities of nature, thrown into combinations according to some common points of similarity. But it may also be allowed that the same facts might be combined in other modes, and without much greater departure from strictness in assigning some of the species to such other modes of combination. Almost all our native species, for instance, might be comprehended in one of these two groups; namely, (1.) Species running out northward, — (2.) Species running out southward. Equally so, might they be associated into two other groups; namely, (1.) Species running out eastward,—(2.) Species running out westward. Some very general, and some very local species would form the exceptions in either of these two cases; or, they would constitute an intermediate type, in which their northern or southern, their eastern or western, tendency is either uncertain or non-existent, at least, while our single island is alone under consideration. On the contrary, it would likewise be possible to subdivide the six types into many others of a minor or subordinate character. But on the whole, these

six appear most true to nature,—that is, to the actual peculiarities of vegetable distribution in Britain.

It may, however, be admitted that in limiting our attention to the island of Britain exclusively, some of the species must be referred to types of distribution, under which they would not be placed if our views took in a larger geographical space. Hence, caution and consideration will be requisite in any attempt to connect these types of distribution in Britain with others formed upon more extended views; as will be shown afterwards.

In connexion with this subject, it has become requisite for the writer of the present work to take some public notice of certain views brought before the attention of the British Association, by Mr. Edward Forbes, on occasion of their meeting at Cambridge, in 1845; and which, by several reports, by a subsequent lecture in London, as also by a more lengthened essay in a geological work, that gentleman has endeavoured to advertise into publicity and credence. In his communication to the British Association Mr. Forbes had made free (if unacknowledged) use of the former labours of the writer of this volume; and in so doing he took to himself credit for results and generalisations which had truly originated with the author of the present work. But not wishing here to interrupt the regular course of his 'Explanations,' by the introduction of comments on the opinions or conduct of Mr. Forbes, he will add the view which he feels authorized and compelled to take, in reference to Mr. Forbes's publications in the matter, as an Appendix at the end of this volume.

EXPLANATIONS OF THE FORMULA.

It is trusted that the preceding explanations will have sufficed to render intelligible the sub-divisions of Britain into provinces and climatic regions or zones, with the grouping of plants into types of distribution. As before mentioned, it appears more expedient to postpone full botanical descriptions of such sub-divisions and groupings, until the distribution of the several species shall have been first reduced into one common *formula*, adapted for easy reference, and for corrective re-examination by the author and other parties. But that formula itself may still require some words of explanation, in the eyes of those persons who are only commencing their studies in botanical geography, and who are unacquainted with the former writings by the same author.

'The London Catalogue of British Plants,' published for the Botanical Society of London, is adopted as a convenient index to the present work, until its completion. The same names will be employed for the species, with some few emendations, suggested by advancing knowledge; and the same numbers will also be retained with the names, for the sake of uniformity in reference. The sign '†', affixed to their names, will distinguish species which have been ascertained to be British since publication of the 'Catalogue.' Those which were excluded from the 'Cata-

logue,' by reason of their insufficient claim to be accounted British, are without numbers to their names. On account of such species having been elsewhere reported as native or naturalised plants, it appeared desirable to make some slight mention of them in the pages of this work.

In the larger and discontinued edition, before adverted to, a woodcut was given with each species, to assist the eye of the reader by a visible diagram of its distribution. In the more condensed plan of the present work, it has been deemed advisable to omit that illustration; some hope being retained, that the omission may be equally well compensated for, hereafter, although in a different manner. The series of figures in the first line, underneath the name of the plant, will answer the same purpose tolerably well for the present. The facts are the same, whether told in a line of text, or shown in a diagram; but it requires a certain mental effort in readers, to conceive the figures *in situ*, if shown only in a line.

Underneath the name of the species, ten lines are devoted to an epitome or condensed sketch of its distribution within Britain. They are designed to show those circumstances which are requisite for the purpose of enabling botanical geographers to make comparisons between the floral statistics of different portions of the earth. It is hoped that the use and application of these data, to the purposes of science, will become sufficiently apparent, as the present work advances; although, to persons little acquainted with its subject, such applications cannot be so clearly apparent while species are treated singly and successively.

The first line shows, by their numbers, the provinces within which the species has been ascertained or reported to grow. The uninclosed numbers show those provinces in which it is so far wild or established as to be fairly considered a British species—native, denizen, or colonist, as

presently to be explained. The numbers which are enclosed by curves, thus ( ), will indicate the provinces within which the species can scarcely yet be deemed really wild, although existent there. Those numbers which are enclosed by angles, thus [ ], will refer to the provinces within which the species has been reported to occur, although under circumstances of doubt which render some confirmation necessary; most of the provinces so distinguished being probably erroneous.

The second and third lines give the north and south limits of the species in Britain, by naming those counties in which occur their extreme localities. The selection of counties to be cited, is made with reference both to the east and the west sides of the island; whereby to convey some idea of the relation of the species to longitude also. Thus, for instance, the county of Glamorgan is named in the north limit of the Clematis; although the other two counties, Salop and Norfolk, are much more northerly. This is done, because, so far as yet ascertained, the county of Glamorgan is the north limit of the Clematis in the longitude of Wales; the alpine character of the two Welch provinces being unfavourable to a shrub which requires a warm summer. Our lists of Cornish plants being yet very incomplete, Devon will be named as the south limit of many species which doubtless do grow also in Cornwall.

The fourth line is devoted to a sort of census of the species. This can only be given approximately, by estimating the number of provinces and of counties within which the species is deemed likely to occur. It is probable that the number of provinces will be set down correctly for the majority of the species; though there may still remain a considerable minority, for which the number of provinces will ultimately be found less exact. The lists of species for South Wales, the Lake Province, and the North and

West Highlands, are still incompletely made out; and there are several dubious species, whose provincial distribution can be very imperfectly known at present. The number of un-enclosed figures in the first line, in contrast with the number given as the estimate, will show where additions have been made to the latter, on assumed probabilities. For counties, the estimated number will often be given much higher than has been actually ascertained; more especially for the common species, which are seldom noticed, except in local floras and catalogues which profess to include everything. The census for counties is estimated by, first, reckoning up those within which the species has been ascertained to occur; secondly, reckoning those from which it is believed to be absent; and, thirdly, adding the rest to one or other side, according to presumed probabilities. Though much is here assumed, particularly with respect to the distribution of the common species, yet the result of this estimate, it is believed, will come very near the truth; the author's attention having been so long directed to the distribution of plants in Britain, that he can usually guess pretty accurately whether any given species will or will not be found in any given county. Of course, there are some exceptions to the accuracy of such guesses, especially in the cases of confused or neglected species, such as Œnanthe peucedanifolia or Ranunculus Lenormandi. As an example, where much has been assumed without certain knowledge, the census of Stellaria media may be cited. On putting together all his local lists, the author cannot show, on authority, that this very common plant grows in so many as sixty counties; but he unhesitatingly assumes it to occur in every county. The whole number of counties is taken at 82; some small counties (Rutland, Kinross, &c.) being sunk into those adjacent, and some isles or groups of isles (Man,

Hebrides, &c.) being reckoned as counties of themselves. The intermediate numbers, between 15 and 80, are taken in steps of 5 or 10, since the use of units would there be only an affectation of exactness; and the nature of the test throws the larger proportion of the species towards one or other extreme of the scale. The series of numbers actually used in the census of counties runs thus:—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 25, 30, 40, 50, 60, 70, 75, 80, 81, 82.

The fifth line indicates the range of latitude and the geographic type. To show the limits in latitude, those figures are used which correspond with the mathematical lines on maps, between which all the known localities are situate. No fractions of degrees are used. Thus, in marking the range of Clematis Vitalba, as 50—53, it is not intended that localities for the species do certainly occur under the mathematical lines of 50° and 53°, but simply that they occur more southerly than 51°, more northerly than 52°. The native localities of the Clematis all occur under the 51st, 52nd, and 53rd degrees; and thus the first lines which indicate whole degrees, south and north of the extreme localities, are those of 50° and 53°. Some little uncertainty will arise occasionally in applying the figures. For example, the parallel of 59° crosses the Orkney Isles, and there are no records adequate to show which of the Orkney species, if any, do not pass to the northward of that line. In this uncertainty, to distinguish those of Orkney from the species which cease in Sutherland or Caithness, all the former are assumed to be bounded northward by the line of 60°. At the other end of Britain, the Cornish species are assumed to be all on the north side of 50°, notwithstanding that the Lizard Point is rather short of that line. Of the Scilly flora, almost nothing is yet known; and hence the parallel of 49° is scarcely used in this work.

The types of distribution have been explained in former

pages of this volume. It may be as well again to remind those who use this work, that such a mode of grouping species, though founded upon fact, can be only a rough view or approximation to nature; many of the species being so intermediate in the character of their distribution, as to render it doubtful, if not optional, to which of the types they should be referred. The first species of the series, the conspicuous Clematis, is an example of a doubtful tpye; while the second one, the easily overlooked Thalictrum alpinum, is an unquestionable example of the Highland type.

The sixth line gives the region or regions, and the zonal range of the species. The regions and zones have also been explained in former pages. In the case of species which occur in both the Arctic and Agrarian zones, an abbreviation is made into the two initial letters "A. A." The zonal range is indicated by naming the highest and lowest zones inhabited by the species, if growing in more than one of them, as is more usually the case.

The seventh line is intended to show the lowest ascertained limit of the species. Comparatively few British species are wholly restricted to localities much above the level of the shores. Hence, for the greater number, the lower limits are indicated with reference to the most southerly provinces within which they descend nearly or quite to the sea level. The expression "coast level" is not to be construed as meaning the actual level of the tides, but simply low situations not much above the sea. For species which do not descend to the coast level in any part of Britain, the lowest altitude is indicated by yards, and usually reckoned by steps of 50 yards.

The eighth line shows the highest limit ascertained for the species, also by steps of 50 yards, without affecting more minute exactness. There are many plants of the

plains or low grounds, not ascending the mountains, the upper limits of which can only be guessed in general terms. Thus, for example, the true upper limits of the Clematis, Euonymus, Tamus, &c., not having been exactly ascertained, they will be indicated in general terms, at 100 or 200 yards.

The ninth line is intended to show the range of mean annual temperature under which the species grows in Britain. It will easily be understood that this cannot be more than an approximation to the true climate. The estimate is made in the following manner. The mean annual temperature of the air (that of the ground being nearly the same), on the south-west coast of England, is taken at 52° of Fahrenheit's scale; that of the south-east coast, at 51°; the estuaries of the Thames and Severn, at 50°; those of the Humber and Mersey, at 49°; those of the Forth and Clyde, at 48°; the extremities of the Caledonian Canal, at 47°; the north coast of Scotland, at 46°. One degree is deducted from inland localities under the same latitude, and one degree also for each hundred yards of elevation above the level of the sea. In applying this rule to particular species, however, some slight allowance has been made for situation. It is probable that the temperature of the atmosphere, with us, decreases more rapidly than one degree for one hundred yards of elevation, while that of the earth decreases less rapidly. On the Highland mountains, between 3,000 and 4,000 feet, the temperature of springs varies but little with altitude, during the summer months; being usually 37° or 38°, where the exit of the water is unimpeded by vegetation.

The tenth line, continued into a paragraph, is intended to show the civil claims and local situation of the species, in accordance with a scale of terms; also to give any other brief notices which may seem desirable or necessary. The

first word is one taken from the following series of terms, used to express the civil claims of the species:—

1. Native.—Apparently an aboriginal British species; there being little or no reason for supposing it to have been introduced by human agency. Examples: Corylus, Calluna, Bellis, Teesdalia.
2. Denizen.—At present maintaining its habitats, as if a native, without the aid of man, yet liable to some suspicion of having been originally introduced. Examples: Aconitum, Pæonia, Viola odorata, Impatiens Noli-me-tangere.
3. Colonist.—A weed of cultivated land or about houses, and seldom found except in places where the ground has been adapted for its production by the operations of man; with some tendency, however, to appear also on the shores, landslips, &c. Examples: Adonis, Papaver, Agrostemma, Melilotus leucantha.
4. Alien.—Now more or less established, but either presumed or certainly known to have been originally introduced from other countries. Examples: Sempervivum, Mimulus, Hesperis, Camelina.
5. Incognita.—Reported as British, but requiring confirmation as such. Some of these have been reported through mistakes of the species, as Ranunculus gramineus. Others may have been really seen in the character of temporary stragglers from gardens, as Gentiana acaulis. Others cannot now be found in the localities

published for them, as Tussilago alpina and other species, reported by or from Mr. George Don; though it is not improbable that some of these may yet be found again. A few may have existed for a time, and become extinct, as Echinophora spinosa.

6. Hibernian, *or* Sarnian.—Native, or apparently so, in Ireland, or in the Channel Isles, though not found in Britain proper.

Any Hibernian botanist who may look at the epitome of distribution for British species, in this volume, will see the unavoidable necessity for omitting Ireland and the distribution of its plants. If he should not immediately comprehend this necessity, let him endeavour to illustrate the distribution of species within Ireland, by a similar formula. He will soon find out that the lack of data would render the effort futile, unless he could first devote several years to the task of collecting and comparing facts.

The author of the present work, indeed, might still say almost the same thing to English botanists, if he could stipulate against any use being made of his own former writings on the same subject. But even under this stipulation, the English botanist would go to work with far more accumulated materials, than could be found in reference to the botany of Ireland. It is much to be wished, however, that some native botanist would commence a Cybele for Ireland, incomplete as he must unavoidably make it. He would, at all events, have one very great advantage, in the absence of those hundreds of false localities which have been published for English plants; and which, being positive errors and misinformation, are far more troublesome than the negative inconvenience of deficient information.

The second word, of the same line or paragraph, is also

one taken from another series of terms which are proposed for expressing, in a brief manner, the usual situations of the species, with respect to shade or exposure, humidity or dryness, the mechanical condition of the soil, and propinquity to the haunts of man and animals. The proposed series of terms runs thus :—

1. Pratal.—Plants of meadows, or rich and damp grass-lands. Examples: Geranium pratense, Rumex Acetosa, Phleum pratense, Ophioglossum vulgatum.
2. Pascual.—Plants of pastures and grassy commons, where the herbage is usually less luxuriant than in the meadow-lands. Examples: Trifolium repens, Achillæa Millefolium, Prunella vulgaris, Aira cristata.
3. Ericetal.—Plants of moors and heaths. Examples: Calluna, Erica, Carex binervis, Scirpus cæspitosus.
4. Uliginal.—Plants of swamps, or boggy ground. Examples: Drosera, Pinguicula, Vaccinium Oxycoccus, Rubus Chamæmorus.
5. Lacustral.—Plants usually immersed in water, or floating on its surface. Examples: Nymphæa, Utricularia, Potamogeton, Subularia.
6. Paludal.—Plants of marshy ground, the roots of which are in water or wet ground most part of the year, or constantly. Examples: Typha, Sagittaria, Thalictrum flavum, Parnassia.
7. Inundatal.—Plants of places liable to be inundated in wet weather, but often dry in summer. Examples: Pulicaria, Rumex acutus, Nasturtium terrestre, Ranunculus hirsutus.

8. Viatical.—Plants of road-sides, rubbish heaps, and frequented places. Examples: Urtica dioica, Lamium album, Chenopodium olidum, Rumex pulcher.
9. Agrestal.—Plants of cultivated ground. Examples: Papaver, Agrostemma, Bromus secalinus, Veronica agrestis.
10. Glareal.—Plants of dry exposed ground, chiefly on gravel or sand. Examples: Trifolium arvense, Ornithopus, Hypochæris glabra, Sedum acre.
11. Rupestral.—Plants of walls and rocks. Examples: Saxifraga tridactylites, Cotyledon, Arabis hirsuta, Asplenium Ruta-muraria.
12. Septal.—Plants of hedge-banks and hedge-rows. Examples: Stellaria holostea, Hypericum perforatum, Bryonia, Tamus.
13. Sylvestral.—Plants of woods and shaded places. Examples: Bunium flexuosum, Lysimachia nemorum, Paris, Monotropa.
14. Littoral.—Plants of the sea-shores. Examples: Convolvulus Soldanella, Steenhammera, Statice, Armeria.

In one or other of the groups, indicated by these terms, almost all our native and naturalised plants may be classed. Many species, however, are so little special in their choice of situation, that two or three of these terms might be almost equally well applied to them. And on the other side, some few are so peculiar in their local adaptations, that they do not very exactly come under any of the terms. In selecting the series of terms or groups, it has been endeavoured to keep a middle course; neither making them so numerous that several must be applied to the same species, nor so few that the exceptional species themselves become

too many. In looking down the series, it will be observed, that the groups of species, so indicated, pass into each other. Thus, the pratal plants are occasionally pascual plants, as Phleum pratense; the pascuals are in turn ericetals, as Prunella vulgaris; the ericetals pass into uliginals, as Scirpus cæspitosus, and so on.

The remainder of the paragraph, continued from the tenth line, is devoted to any remarks in explanation of the epitome, or such other observations as may appear requisite; due regard being had to restriction in the quantity of text. A great and interesting division of the general subject is left untouched here; namely, the relations of plants to the soil and subjacent rocks, hitherto neglected, or only attempted in a feeble and inadequate manner. Inquiries in relation thereto would demand a different method of treating distribution, scarcely compatible with the wider and more comprehensive objects here aimed at. This work deals with the climatal and geographical relations of plants: there is still room and call for another, devoted to their geological and mineralogical connexions; for such connexions they undoubtedly have in an intimate degree.

But "non omnia possumus omnes" is a maxim which must needs be acknowledged by him who seeks to carry forward any department of science. He may take a wide field, who wishes only to learn over again what others have first ascertained and recorded; but he must keep to a narrower track, who attempts to step beyond the known and familiar ground. And, at best, he will move slowly when once beyond the beaten road.

After all the time and thought devoted to preparing the materials for the present work, in compiling from the writings of other botanists, in sifting out the false from the true, and in collecting a vast number of additional facts and notes in the wilds of nature, the Author may well fear that

there will unavoidably be much in the pages of his own work, which is either imperfect or erroneous. The series of volumes is intended to comprise a condensed record of very numerous facts, themselves selected or generalised from tens of thousands of other special facts; and this condensation cannot be accomplished without errors and oversights. All knowledge is progressive; and each department of science demands the time and exertions of many labourers, in ascertaining and recording its facts, in comparing and generalising them.

As in our earliest FLORAS, much was faulty or omitted, and left for after correction; so, in the earliest CYBELE, there will doubtless be found many errors and blemishes for subsequent removal or rectification. Should the Cybeles ever become as numerous as the Floras, the writing of one may *then* be found a task of no greater thought or difficulty, than the writing of a new Flora may *now* be found. But even at the present day, after publication of so many predecessors, the writing of a new British flora is still a task of some labour. May not the author of this volume, therefore, justifiably plead the scope and laboriousness of his own undertaking, almost the first of its kind, in extenuation of any imperfections which may appear therein? *

* I should feel indebted to botanists, who may discover any species in those provinces which are left blank (that is, distinguished only by an '*,' in place of a *no.* in the line which shows the area of the species) if they would kindly communicate the information. And the request may be extended to any other information, calculated to supply omissions, or to correct errors in this work; which can be accomplished, probably, by a Supplement. But mere repetitions of localities, already ascertained and published, are only inconvenient additions to the bulk of my notes, without being any addition to the amount of knowledge. There is a sort of egotistical tendency in beginners in any study, to suppose that what is

new to themselves, must be new to science, and therefore meriting public announcement. We all go through this initiatory process, before we learn to distinguish the new from mere "repetitions wearisome of sense." I feel the more desirous to have the vacancies in the provincial areas filled up, on good authority, being in hopes shortly to publish a series of provincial lists of species, in order to show the personal authority upon which the area of each species is set down in this present work.

It may not be amiss to observe, for the benefit of lady readers, or others who are not familiar with Greek and Latin names, that the one adopted for the present work, is to be pronounced in three syllables, thus, 'Cy-be-le.'—(H.C.W.)

DISTRIBUTION OF SPECIES.

1. CLEMATIS VITALBA, *Linn.*

Area 1 2 3 4 5 6 (7 8 * 10 11 * * 14 15).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Norfolk, Shropshire, Glamorgan.
Estimate of provinces 6. Estimate of counties 30.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone only.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in the Channel.
Range of mean annual temperature 52—48.

Native. Septal. In the first five provinces, occurs copiously in many places, on chalk or other calcareous ground. In South Wales, very local; being recorded only from Glamorganshire. In North Wales, solely on the authority of Mr. Rowland, who includes it in his list of plants observed about Wrexham. In Trent, occurs at Nottingham Castle, and is reported to grow elsewhere in the same county. In Humber, may possibly be indigenous in the hedges near Whitby, where it was observed by the Rev. Andrew Bloxam. In Tyne, said to be naturalized on the ballast hills. In Scotland, has been reported from the neighbourhood of Edinburgh, and of Callander; but doubtless planted there. The type of distribution may be deemed intermediate between the English and Germanic; the Clematis being too frequent in the Peninsula and Severn provinces, to allow of its type being held strictly Germanic, although so very rare in Wales.

2. THALICTRUM ALPINUM, *Linn.*

Area * * * * * * 7 [8] * 10 11 12 13 * 15 16 17 18.
South limit in Caernarvonshire and Yorkshire.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 9. Estimate of counties 20.
Latitude 53—61. Highland type of distribution.
A. A. regions. Superagrarian—Superactic zones.
Descends to the coast level, in the North Highlands.
Ascends to 1300 yards, in the East Highlands.
Range of mean annual temperature 46—34.

Native. Uliginal. In the provinces southward from the Highlands, it is very local on some of the mountains, at elevations of 400 to 800 yards, more or less. In the Highlands, becomes much more plentiful on wet rocks and in swampy spots on the moors; descending to 350 yards, at Dalnacardoch, in Perthshire; lower, near the east coast of Rossshire; to the sea-shore, on the north coast of Sutherland. Said to be abundant on heaths in Shetland. The locality of Castleton, Derbyshire, reported by Mr. Irvine, cannot be trusted. This is truly an arctic species, and the specific name should be construed with reference to climate, and not as indicating any predilection for the Alps, as seems to be implied by those botanists who write the name with an initial capital,—"Alpinum."

3. THALICTRUM MINUS, *Linn.*

Area 1 * 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18.
South limit in Devon, Somerset, N. Hertfordshire.
North limit in Orkney, Sutherland, Lewis.

Estimate of provinces 17. Estimate of counties 50.
Latitude 50—59. Scottish type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level (?), in the Peninsula.
Ascends to 650 yards, in the Lake province.
Range of mean annual temperature 52—41.

Native. Rupestral. In the Peninsula, Thames and Severn, extremely local. In Ouse, several localities are recorded; and as it occurs also on the coasts of South Wales, the type of distribution shows some tendency to become British, rather than the Scottish. Its chief prevalence is from North Wales to the East Highlands; only few localities being known in the two most northerly provinces. In none of the provinces can it be deemed a common species. Though found also in many places inland, on or among hills, this species seems to have some considerable tendency to the sea coast.

3, b. THALICTRUM MAJUS, *Jacq.*

Area * [2 3] * * * * * * 10 11 12 13 14 15.
South limit in Yorkshire and North Lancashire.
North limit in Perthshire and Kirkcudbrightshire.
Estimate of provinces 6. Estimate of counties 10.
Latitude 53—57. Scottish type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends to the coast level, in the province of Tyne.
Ascends to — ? (say, 300 or 400 yards in N. England).
Range of mean annual temperature, 48—44.

Native. Rupestral. The distribution of T. majus is imperfectly known. If really a species distinct from T. minus, several of their localities are perhaps published for the wrong species. T. majus would seem to have a more li-

mited range in every respect, of area, of altitude, of temperature; also to be of less frequent occurrence within its more limited space. Localities were published for this plant in the provinces of Channel and Thames, on the authority of Dr. Maton and Rev. H. Davies; but there seems good reason to presume that T. flavum must have been mistaken for the present species. Individually, I cannot form any satisfactory conclusion as to whether this is, or is not, specifically distinct from T. minus.

4. THALICTRUM FLAVUM, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 * 13 14 15 * [17].
South limit in Devon, Isle of Wight, Kent.
North limit in Fifeshire and "Banks of the Clyde."
Estimate of provinces 15. Estimate of counties 50.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Paludal. Though finding no reported locality for the provinces of South Wales and the Lakes, I have supposed the species more likely to occur there, than to be quite absent; and have so estimated its census by provinces at 15, instead of the ascertained number of 13 only. Perhaps, the West Highlands might also have been added to the number. The locality of "Sandside, Caithness," published on the authority of Mr. Torrie, should doubtless have been given for T. minus, which I have myself observed there. I am unaware of any locality higher than the Willow island, near Settle, where this species was seen by Mr. Tatham; and more by guess, than knowledge of fact, I

would call the altitude 150 yards. The type of distribution inclines to British.

5. ANEMONE PULSATILLA, *Linn.*

Area * * 3 4 5 * * 8 * 10.
South limit in Gloucestershire, Berks, Herts.
North limit in Lincolnshire and Yorkshire.
Estimate of provinces 5. Estimate of counties 10.
Latitude 51—54. Germanic type of distribution:
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to — ? (Altitude trifling, but not known).
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 49—47.

Native. Pascual. A very local plant, on chalk downs and on limestone. Reported to grow in the counties of Berks, Oxford, Herts, Suffolk, Cambridge, Bedford, Northampton, Gloucester, Lincoln and York. Perhaps its altitude, in Gloucestershire, may be 150 or 200 yards; in Suffolk, below 100 yards.

6. ANEMONE NEMOROSA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire and ——— ?
Estimate of provinces 17. Estimate of counties 80.
Latitude 50—58. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 950 yards, in the East Highlands.
Range of mean annual temperature 52—38.

Native. Sylvestral. Plentiful throughout England and most parts of Scotland; being least so in the provinces of Ouse, West and North Highlands; and remaining still unrecorded from any of the three groups which consitute the province of North Isles. Its general limit of altitude, in the East Highlands, runs about 600 or 700 yards; though it was traced above 950, on the Breadalbane mountains, near Killin.

7. ANEMONE APENNINA, *Linn.*

Area (* * 3 4 5 * * * * 10 * * * * 15).

Alien. Probably introduced into this country from Italy, as a plant suitable for ornamental uses. Is said to have occurred wild, accidentally or by naturalisation, in the counties of Surrey, Middlesex, Hertford, Bedford, Salop, York and Banff. Of these, the first and last seem to have the best claim to the plant, which has existed in the grounds of Wimbledon Park considerably more than a century; and the Rev. G. Gordon remarks that it "has undoubtedly become wild at Cullen, an old family residence of the Earls of Finlatter."

8. ANEMONE RANUNCULOIDES, *Linn.*

Area (* * 3 4 5 * * 8) [14].

Alien. Scarcely a naturalised plant in Britain; though introduced into Hudson's Flora Anglica, and retained by succeeding authors. The counties of Kent, Hertford, Suffolk, Salop and Nottingham, have been indicated for this species; that of Berwick, turning out to be an error, through the mistaking of Ranunculus auricomus for the present plant.

9. ADONIS AUTUMNALIS, *Linn.*

Area * 2 3 4 (5 * * 8 9 * 11 * 13 14).
South limit in Dorsetshire, Isle of Wight, Kent.
North limit in Suffolk, (Oxfordshire?), Wiltshire.
Estimate of provinces 3. Estimate of counties 8.
Latitude 50—53. Germanic type of distribution.
Agrarian region. Inferagrarian zone only.
Descends to the coast level, in the Channel.
Ascends to about 100 yards, in the Thames.
Range of mean annual temperature 51—48.

Colonist. Agrestal. Found chiefly on the chalky corn lands in the province of Thames; where it is now so well established as an agricultural weed, that it can scarcely be held an alien, although, in all likelihood, first imported into this country with seed corn from the continent of Europe. Dr. Bromfield considers it also quite naturalised in the Isle of Wight; and the same botanist has favoured me with specimens from Ouse. In the other provinces, it can yet be held scarcely more than an occasional straggler.

10. MYOSURUS MINIMUS, *Linn*

Area 1 2 3 4 5 * * 8 9 10 11.
South limit in Devon, Isle of Wight, Kent.
North limit in Northumberland and Cheshire.
Estimate of provinces 10. Estimate of counties 30.
Latitude 50—55. Germanic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 51—47.

Native. Agrestal. Though chiefly an agrestal or corn field plant, yet, as occurring also in gravel-pits and other analogous situations, there seems no reason to question its being a true native. Frequent in the provinces of the Thames and Ouse; decreasing westward and northward. Recorded from single localities only in the provinces of the Mersey and Peninsula; rare or local in that of Tyne; still unrecorded from Wales or Scotland, as also from the Lake Province. As it is a little plant, likely to be overlooked, I have ventured to add one more to the nine provinces ascertained for it in England, and so make the estimate into ten. South Wales seems the blank most likely to be hereafter filled up by the discovery of the Myosurus there. Ascertained in 28 counties.

11. RANUNCULUS AQUATILIS, *Linn.*

Area, general.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Orkney and the Hebrides.

Estimate of provinces 18. Estimate of counties 81.

Latitude 50—60. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 350 yards, in the East Highlands.

Range of mean annual temperatare 52—43.

Native. Lacustral. Plentifully distributed over Britain; though becoming much less frequent in the Highland provinces; while in the most northerly of the three groups of North Isles, it would seem to be quite unknown, being omitted from the Flora of Shetland. Probably rare on elevated ground, but was observed in small quantity near

Castletown, in Aberdeenshire; and on account of that locality the range of temperature is carried down to 43 degrees, and that of altitude up to 350 yards.

11,c. RANUNCULUS PEUCEDANIFOLIUS, *All.*

Area * 2 3 4 5 * 7 8 * 10 * * * 14.
South limit in —— ?
North limit in Edinburgh and —— ?
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Lacustral. Inhabits streams, but is "not confined to running water," (Bab. Man.). Probably distributed throughout England and some part of Scotland; but having been frequently confounded with slighter varieties of R. aquatilis, equally called fluitans or fluviatilis, its true distribution cannot be determined at present. I follow De Candolle, Steudel and other continental authorities, in referring the R. fluitans (properly so named) of English writers to the R. peucedanifolius of the Flora Pedemontana. I kept a root of this plant in a small pan of water, eight inches in diameter, near two years. It produced no flowers, but continued to vegetate, and re-supply the loss of branches which sloughed away or were destroyed. The leaves become gradually shorter; those last produced being tripartite or ternate, the segments only half an inch long and about the eighth of an inch broad. The plant perished during the hot weather of June 1846. I still feel in doubt whether to hold it as a species or as a persistent variety.

12. RANUNCULUS CIRCINATUS, *Sibth.*

Area 1 2 3 4 5 6 * 8 * * 11 * * 14.
South limit in —— ?
North limit in Edinburgh and —— ?
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Lacustral. Inhabits ditches and streams. Probably frequent in England, and likely to occur in all the first fourteen provinces; but as with R. peucedanifolius, there seems much uncertainty respecting the correctness of the localities indicated; the ordinary 'pantothrix' form of R. aquatilis being frequently mislabelled R. circinatus. When planted in a flower pot, plunged into a pan of water, I found the segments of the leaves afterwards produced, were thrice the length of those produced before, much less rigid, and the whole leaf convex above, not plane. Accidents twice deprived me of the plants after a few months growth. They produced no flowers, though increasing freely in leaves and ramification. I cannot avoid a still lingering suspicion that R. circinatus is only a variety of R. aquatilis; but as we really have no positive test of species, except the apparent persistence of certain physical characters, this may be held as one for the present.

13. RANUNCULUS HEDERACEUS, *Linn.*

Area, general.
South limit in Devon, Isle of Wight, Kent.
North limit in Sutherland and Isle of Lewis.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—59. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends nearly to 800 yards, in North Wales.
Range of mean annual temperature, 51—41.

Native. Lacustral. Distributed throughout Britain, unless the Orkney and Shetland Islands be exceptions to its generality. In the Highland provinces, it has not been observed higher than R. aquatilis; but on Carnedd David, in Caernarvonshire, I saw it so high as 2350 feet; and in accordance with this elevated locality, the species is here assigned to the lowest zone of the arctic region, and a lower temperature indicated for it than for the allied species, R. aquatilis. We have here an example of the latitude necessary in applying the terms which denote the local situations of species. When in water, the present is a floating species, like R. aquatilis, and comes best under my definition of "Lacustrals;" but it grows out of water so frequently, as to be almost as well placed among the "Paludals" or "Inundatals."

13,b. RANUNCULUS LENORMANDI, *Schultz.*

Area 1 * 3 * 5 * * 8 9 * * 12.
South limit in —— ?

North limit in —— ?

Estimate of provinces 14. Estimate of counties 60.

Latitude 50—55. British (?) type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends nearly, or quite, to the coast level.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 50—47.

Native. Lacustral ? Attention having only of late been directed to this plant, as possibly a distinct species from R. hederaceus, its real distribution has yet to be ascertained; it will probably be found through England and the Lowland provinces, if not also in the Highlands. Some of the localities, formerly recorded for R. hederaceus, may likely belong to this present plant; but where seen by myself, it grows intermingled with R. hederaceus. I have hitherto seen R. Lenormandi only out of water, though in spots which must be under water in the winter season, and liable to be flooded in summer. In describing the distribution of R. hederaceus, in Part First of a former work, I remarked that "there are several strongly marked varieties, both as to the form of the leaves, and form and size of the petals, though these are not dignified by different specific names, as are the varieties of the still more changeable R. aquatilis" (Jan. 1843.) This was something like a forethought of what was soon to come. In the following May, Mr. Babington's Manual appeared, which recorded one of the varieties, that of the larger-sized flowers; and next winter, the same variety was introduced into the 'London Catalogue of British Plants,' on account of its larger and more lobed leaves. It has since appeared that the variety 'grandiflorus' (Bab. Man.) and 'partitus' (Lond. Cat.) was attracting attention on the continent also; being figured as a new species under name of R. Lenormandi. As something different from R. hederaceus, however, it had been

noticed years before; there being a very fine example of the plant in the herbarium of Sir W. J. Hooker, to whom it came among the Asturian plants of Durieu, labelled with a double mark of doubt "Ranunculus hederaceus? ?" (See Annals, xvi, 141; Phytol. ii. 467 and 497.)

RANUNCULUS ALPESTRIS, *Linn.*

Area [15].

Incognita. It is difficult to decide under what category of citizenship or civil claim this Alpine Ranunculus ought to be placed. The existence of a specimen in the Smithian herbarium, with a memorandum that it was collected in Forfarshire, by Mr. George Don, seems very good evidence in favour of its nativity; and yet no other botanist, among the many who have searched the mountains of that county, has ever detected an example of this species there. Moreover, its geographic distribution otherwise would not much incline us to expect the species in Scotland; since it is not found in Scandinavia, nor any of the arctic lands. At the time when Mr. Don was a collector, it was not the custom with botanists to be very particular in recording the localities and distribution of plants; and they might not always be sufficiently careful in keeping British and foreign, or wild and garden examples of the same species, apart from each other. I possess ample proof, that a noted botanist of the Smithian school and age, and of good integrity, distributed garden-grown examples labelled from wild stations. In the case alluded to, there was no intentional deception; but if, in this practice, he had chanced to send Smith a wrong (not British) species, instead of the one seen in the wild station, the author of the English Flora would probably have enrolled it among our natives. And the same

mistake might have occurred, had a foreign specimen (of a supposed British species) been sent in the manner of the garden specimen; that is, labelled as if the identical *specimen* had come from a native locality, although the writer of the label intended only to indicate that the same *species* grew in such locality. Mr. Don's memorandum, as given in Smith's herbarium, runs thus: "By little rills and among rocks on the mountains of Clova, Angus-shire, seldom flowering.—G. Don, April 3, 1809."

14. RANUNCULUS FICARIA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * 17 18.
South limit in Cornwall, Isle of Wight, Kent,
North limit in Shetland, Orkney, —— ?
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 800 yards, in North Wales.
Range of mean annual temperature 52—41.

Native. Septal. In all likelihood this is plentifully distributed throughout Britain, the higher hills excepted; and yet I find no authority for its occurrence in the West Highlands. But as it is stated to be common about Glasgow, we may suppose that it occurs in Dumbartonshire. The explanation why it is omitted from four different lists of plants observed in tracts of the West Highlands, by Professor Balfour or myself, is doubtless to be found in the circumstance of those lists having been made, during visits to that province, late in the summer, after the flowering season of this early species. I have not met with it upon

the mountains of Scotland, but found it at 2400 feet in Caernarvonshire.

15. RANUNCULUS FLAMMULA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 900 yards, in the East Highlands.
Range of mean annual temperature 52—38.

Native. Paludal. Abundantly distributed throughout Britain. Pretty frequent on the mountains up to about 2000 feet, but very rare above 2500 feet. Did we rely upon localities, as recorded in books, we should suppose that the creeping variety, with filiform stems (R. reptans, of Lightfoot) is also distributed throughout Britain, from Cornwall to Shetland. But the only example of Lightfoot's plant, in my herbarium, among many sent to me under that name, is one from the border of Loch Leven, in Kinross-shire, where it was collected by Dr. Wight. In the 'London Catalogue' the name of "pseudo-reptans" distinguishes the spurious variety from the true "reptans" of Lightfoot. I have Italian specimens, from Mr. Ball, which scarcely differ from Lightfoot's, but which Mr. Ball thinks to be truly R. Flammula, though they "exactly agree with the North American" R. reptans.

RANUNCULUS GRAMINEUS, *Linn.*

Area [7].

Incognita. "Specimens brought from North Wales, by Mr. Pritchard;" *With. Arr.* The locality has been reported "in the neighbourhood of Llanroost," but botanists have vainly sought the present species in that neighbourhood; and as the authority seems so slight and insufficient, we may conclude that R. Flammula was mistaken for R. gramineus. I remember to have fallen into the same error myself, during my first year of botanical study, and to have imagined that I had found R. gramineus in Cheshire; the proximity of that county to Wales, and the use of Withering's work, favouring the idea.

16. RANUNCULUS LINGUA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * * [18].
South limit in Dorset, Isle of Wight, Kent.
North limit in Moray and Lanarkshire.
Estimate of provinces 15. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Paludal. Pretty frequent, though by no means general, in England and Scotland, from the Isle of Wight northwards to Moray. There seems reason to suspect that several of the recorded localities are erroneous, through the mistaking of large examples of R. Flammula for the pre-

sent more local species. Assigned to the superagrarian zone, because found in Aberdeenshire and Moray. I have also a specimen, through the London Society, from Loch Earn, in Perthshire; which is probably upwards of a hundred yards above the sea, and either bordering upon or within the superagrarian zone. Perhaps the temperature should be carried one degree lower than 47.

17. RANUNCULUS OPHIOGLOSSIFOLIUS, *Vill.*

Sarnian. Found by Mr. C. C. Babington, in St. Peter's Marsh, Jersey. Should be looked for in the southern counties of England; where, possibly, it may have been overlooked by reason of its close similitude to the broad leaved form of R. Flammula.

18. RANUNCULUS AURICOMUS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.
South limit in Devon, Isle of Wight, Kent.
North limit in Moray and near Glasgow.
Estimate of provinces 16. Estimate of counties 70.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 500 yards, in the East Highlands.
Range of mean annual temperature 51—42.

Native. Sylvestral. Frequent in England; less so in Scotland. Apparently scarce in the East Highlands, and not yet ascertained to be a native of the West, or of the two more northerly provinces. I observed it above Castletown, in Aberdeenshire, at an altitude estimated to exceed

1500 feet; but have no certain recollection of seeing it equally high elsewhere. That altitude raises it almost into the arctic region, so that there seems no climatic cause to prevent its occurrence in the West and North Highlands.

19. RANUNCULUS ACRIS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1300 yards, in the East Highlands.
Range of mean annual temperature 52—34.

Native. Pascual. Truly one of the most universally distributed among our native species; ranging from the extreme south to the extreme north, from the coast to the summits of nearly the highest hills. I observed it at 1200 yards, or upwards, on the Nevis range, and almost to the summit of Ben Lawers, which is near 4000 feet in height.

20. RANUNCULUS REPENS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.

Ascends to 900 yards, in the East Highlands.

Range of mean annual temperature 52—38.

Native. Agrestal or Viatical. Distributed as generally, and almost as plentifully, as R. acris, in the agrarian region; partly, through the operations of mankind, which adapt the ground for its support, by working and manuring. As we ascend the mountains, its frequency greatly lessens; and it is rarely seen so high as 2000 feet; although on Ben Lawers, it was observed in one spot supposed rather to exceed 900 yards. The uppermost localities are usually by the side of water, or in other spots to which sheep or cattle resort.

21. RANUNCULUS BULBOSUS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 * (18).

South limit in Cornwall, Isle of Wight, Kent.

North limit in Moray and Dumbartonshire (?).

Estimate of provinces 17. Estimate of counties 75.

Latitude 50—58. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 500 yards, in the East Highlands.

Range of mean annual temperature 52—42.

Native. Pascual. Abundant in England and the South of Scotland; and said to be frequent so far north as Moray. It would seem to be rare, if really wild, northward of the Caledonian Canal. It has no place in the Flora of Shetland; nor is it mentioned by Balfour and Babington, in their list of Hebridean plants. In a manuscript Flora of Orkney, for which I was indebted to Dr. Gillies, the name occurs, but only on the suspicious authority of Lowe's list, in Barry's History of Orkney. I do not find the name in

lists of plants which were observed by myself in the north of Sutherland, north of Caithness, east of Sutherland, east of Ross, west of Inverness-shires; nor is it marked in a printed list of British plants, checked for Ross and Cromarty-shires, by the Rev. George Gordon. On these grounds, I have hesitated to receive it as a native of Orkney. Rarely seen at much altitude; but was observed near Pitmain, in Moray, at 750 feet; by Dalnacardoch, in Perthshire, estimated to be 1050 feet; above Castletown, in Aberdeenshire, at about 1500 feet: possibly introduced to these places.

22. RANUNCULUS HIRSUTUS, *Curt.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Perthshire and Argyleshire.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—57. British (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Inundatal. Inhabits road-sides, especially in spots where water stagnates in winter and wet weather; also found in cultivated fields and "wet meadows." Either frequently overlooked, or else but thinly distributed through its rather extended area. Its occurrence in two of the Highland provinces has induced me to refer it to the British rather than the English type of distribution. According to priority, I presume that the Linnean name "R. parvulus" is the correct one. Continental authors chiefly use that of "Philonotis." Slightly within the superagrarian zone.

23. RANUNCULUS SCELERATUS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 16 17 18.
South limit in Devon, Isle of Wight, Kent.
North limit in Lewis and Ross-shire.
Estimate of provinces 18. Estimate of counties 75.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Paludal. Scattered pretty frequently through the chief part of Britain. Perhaps the range of temperature should be brought down to 46, in consideration of its high northern latitude in Lewis. More frequent near the sea, but often seen in the inland counties.

24. RANUNCULUS PARVIFLORUS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Durham and Lancashire.
Estimate of provinces 11. Estimate of counties 40.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature, 52—48.

Native. Agrestal or Glareal. A scarce species, yet occurring in many places within the first five provinces; apparently less known in those of Wales and Trent; quite a

rarity in those of Humber and Tyne; its most northern locality, according to Winch, being "by the road-side between Cockerton and Norton," in the county of Durham.

25. RANUNCULUS ARVENSIS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 * * * [18].
South limit in Devon, Isle of Wight, Kent.
North limit near Edinburgh and Glasgow.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Colonist. Agrestal. Abundant, though still locally so, in some of the more southern counties of England; decreasing northwards, and scarcely better than an alien about Edinburgh and Glasgow. If originally introduced with corn, as seems probable, it is now a well-established weed in the south of England.

26. CALTHA PALUSTRIS, *Linn.*

Area, general.
South limit in Devon, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1150 yards, in East Highlands.

Range of mean annual temperature 51—36.

Native. Paludal. Distributed as generally, and almost as plentifully, as the Ranunculus acris. But while the Ranunculus rather decreases in abundance northwards and upwards, the Caltha becomes less plentiful towards the drier lands and climate of the south or south-east of England; so that, to a Metropolitan botanist, the Caltha may seem almost like a rare plant, when compared with the Ranunculus. The south limit, doubtless, is in Cornwall, though I find no record thereof. NB. High on the mountains of Scotland, where the springs have a temperature of 38°, of Fahrenheit's scale, in July, the Caltha palustris becomes very dwarf and small-flowered; but it is there still only a reduced form of the same species. Neither ought the C. radicans, of Forster, to be looked upon as anything else. About Castletown, in Braemar, in swampy places, and especially in the drains cut across wet meadows in a boggy soil. I have seen plants with the stems flat to the ground, and rooting from their joints as they creep along it; the flowers much smaller than are seen in English marshes, the petals being remarkably narrowed, but not so very small as those of the variety "minor" occasionally are; the leaves more triangular, and much more sharply serrated, than those represented for C. radicans, in English Botany, 2175. But I am fully satisfied that these differences, strong as they appear in the extreme examples, are quite insufficient for specific diagnosis; since they may be traced, degree by degree, in the most complete and satisfactory manner, into the two commoner forms, the lowland and the mountain forms, or C. palustris and C. palustris *var:* minor. In the summer of 1844, I examined the plants extensively and carefully, with a view to this question, almost daily during a sojourn of some weeks in Braemar and neighbouring places. Caltha radicans may be retained as a book species,

"in compliment to its author;" but it is no species in nature, apart from C. palustris. Hooker correctly places the one as a variety of the other.

27. TROLLIUS EUROPÆUS, *Linn.*

Area * * * * 5 6 7 8 9 10 11 12 13 14 15 16 17 18.
South limit in Glamorgan, Worcestershire, Derbyshire.
North limit in Shetland and Sutherland.
Estimate of provinces 14. Estimate of counties 50.
Latitude 52—61. Scottish type of distribution.
A. A. regions. Midagrarian—Midarctic zones.
Descends to the coast level, or nearly so, in Wales.
Ascends to 1050 yards, in the East Highlands.
Range of mean annual temperature 47—37.

Native. Pratal or Paludal. By no means a common plant, and yet pretty frequent by stream sides and in damp meadows, from Wales to the Grampian mountains. Apparently scarce in the North Highlands and North Isles. It flourishes by water-falls and on wet rocks among the mountains; but whether the apparent preference for such situations arises from their inaccessibility to sheep, or from their humid soil and atmosphere, may admit of question.

28. ERANTHIS HYEMALIS, *Salisb.*

Area (* * 3 * * * * 8 * * * * * 14).

Alien. Lately introduced into lists of British plants, on extremely slender grounds. In Babington's Manual, it is stated to be "naturalised in thickets in the South of England;" but no authority is adduced in support of this statement, nor is any place mentioned as the habitat of the spe-

cies. In Webb and Coleman's Report, it is said to be "scarcely naturalized" in Hertfordshire. I have a specimen from the Rev. T. Butler, through the Botanical Society of London, labelled "Langar," in Nottinghamshire. Mr. Thomas Edmondston stated that he found it at Craigmillar Castle, in the Edinburgh circuit, a spot which must have been previously visited and examined by scores of botanists. These are all the localities with which I am acquainted by report. I have occasionally seen tufts of it in ornamental plantations, and on the sites of old gardens; but I should not have published it as a "naturalized" British species, simply because it lives where planted by by the hand of man.

29. HELLEBORUS VIRIDIS, *Linn.*

Area 1 2 3 4 5 (6 7 8 9) 10 11 (12 13 14).
South limit in Dorsetshire and Sussex?
North limit in Yorkshire or Durham.
Estimate of provinces 7. Estimate of counties 20.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, or nearly so, in England.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Denizen. Sylvestral. It is doubtful whether this should not rather be called 'alien' than 'denizen.' Though admitted into our floras from the time of Ray, there has usually been some expressed or implied suspicion of its being an alien in England. Hooker marks it an introduced species. Babington admits as a true native, without any indication of doubt. The few localities in which it has been seen by myself, were so apparently the result of a former

introduction, that I can cite none worth recording. Most of those published in books, are obviously suspicious, as in orchards and plantations, about walls and old houses, &c. If really native in England, this may most likely be the case in the limestone or chalk tracts of the southern and eastern provinces. Great confusion exists between the localities recorded for this species and H. fœtidus.

30. Helleborus fœtidus, *Linn.*

Area 1 2 3 4 5 6 (7 8 9) 10 11 (* 13 14 15).
South limit in Somerset, Isle of Wight, Sussex.
North limit in Durham and Yorkshire.
Estimate of provinces 8. Estimate of counties 20.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, or nearly so, in England.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Denizen. Sylvestral. Though great doubt attaches to the true nativity of this species also, within Britain, it may be held more likely a native than H. viridis. Hooker equally marks it (*) an introduced species. Babington attaches the mark (†) of suspicion. But Dr. Bromfield, probably the best authority in the question, holds the present a true native; while he allows the H. viridis to be more disputable. In the London Catalogue, the name of the present species was inadvertently printed in italics, instead of that of H. fœtidus, though the intention was to follow the views of Dr. Bromfield, in admitting the latter to be the native species. I have seen localities in Derbyshire, Cheshire, Surrey, &c.; but all very suspicious; as, for instance, that of the rocks at Matlock Bath, on which several other

garden plants have been introduced for ornament. For the Lake province we have no better authority than the utterly un-trustworthy assertion of a Keswick guide. It is unfortunate that botanical tourists should make the frauds and falsehoods of the Lake guides profitable to them.

31. AQUILEGIA VULGARIS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 (14 15 16).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Durham and Dumfries-shire.
Estimate of provinces 13. Estimate of counties 35.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends probably to 200 yards, in Humber.
Range of mean annual temperature 51—47.

Native. Sylvestral and Rupestral. Inhabits woods and banks, chiefly on calcareous ground, by lakes and streams, on rocks, &c.; so that it might be designated either 'sylvestral' or 'rupestral,' almost equally correctly. Though introduced to many of its recorded localities, it is no doubt a real native of this country. I should say, certainly native in Kent and Cumberland. Dr. Bromfield deems it to be "truly wild" in the Isle of Wight; and Mr. Gutch pronounces it equally so "on the rugged banks of the Garple, a small mountain stream, a tributary of the Evan Water, in Annandale, Dumfries-shire." The more northerly localities in Scotland, probably, originate from gardens.

32. DELPHINIUM CONSOLIDA, *Linn.*

Area (1 2 3) 4 (5 6 * 8 * 10 11 * *,14).
South limit in Suffolk and Bedfordshire ?
North limit in Norfolk and Cambridgeshire.
Estimate of provinces 1. Estimate of counties 4.
Latitude 52—53. Germanic type of distribution.
Agrarian region. . Inferagrarian zone.
Descends to a slight altitude above the coast level.
Ascends to a trifling altitude only.
Range of mean annual temperature 49 or 48.

Colonist. Agrestal. Established in the counties of Ouse; and likely to become so in the Thames province also. In other parts of England, it is little more than a casual straggler, which acquires no permanent habitat. Mr. Lees asserted that he found it "truly wild on the sandy shores of Swansea bay;" and yet Mr. Flower could not see it there at all. Though it has apparently kept its hold of the ground in Cambridgeshire, from the time of Dillenius, it has yet spread so little about England, that the term of 'alien' might still apply to it, in preference over that of 'colonist.' But in the case of agricultural weeds, which are so liable to immigrate into all countries, some looseness may be allowed in the application of my series of terms; or, rather, the signification of the word 'colonist' may be understood to range from an established alien to a scarcely doubtful native, if weeds of "cultivated land."

33. ACONITUM NAPELLUS, *Linn.*

Area 1 (2 3) * 5 6 7 * * (10 * * 13 * * * 17).

South limit in Somerset.

North limit in Denbighshire.

Estimate of provinces 4. Estimate of counties 6.

Latitude 52—54. Atlantic type of distribution.

Agrarian region. Inferagrarian (and Midagrarian?) zones.

Descends to a trifling elevation in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature, say 49—47.

Denizen. Sylvestral. Inhabits shady places, chiefly along the banks of streams. Very decided differences of opinion have been expressed regarding the native claims of the Aconitum; the majority would seem to cherish a very protestantly English feeling against allowing British rights to the Monk's-hood; but there is a minority of some weight, willing to acknowledge the symbol of catholicism. The late Mr. J.E.Bowman pronounced the plant "undoubtedly wild in several places in Denbighshire." Mr. Newman writes, in reference to localities for it about Leominster, Herefordshire, "I have seldom seen a plant which exhibits more manifest symptoms of being indigenous." And Mr. Conway says, "most unquestionably truly wild," near Pontnewydd Works, Monmouthshire. It is reported to be perfectly established, if not aboriginally a native, in Somersetshire. On the faith of specimens from Mr. Moggridge to the Botanical Society of London, I venture to add South Wales to the three provinces by which it is half encircled. In shrubberies, it seeds freely, and increases also by root, so as to keep hold of the ground with much tenacity where once introduced; and this tendency may readily acount for its lengthened spread along a stream side. But, on the whole, the testimony seems to warrant me in designating the plant 'denizen' rather than 'alien.' The late Professor Graham found this Aconite on the site of an old deserted

garden between Shieldag and Jeantown, in the west of Ross-shire.

34. PÆONIA CORALLINA, *Retz.*

Area 1 * [3].
South limit on Steep Holmes, Somerset.
North limit on the same island.
Estimate of provinces 1. Estimate of counties 1.
Latitude between 51—52. Local type.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in its locality.
Ascends scarcely above it, probably.
Mean annual temperature about 50.

Denizen. Rupestral. Inhabits the rocky cliffs of Steep Holmes, an islet of the Severn estuary; and said to have been abundant there formerly, though nearly eradicated in 1834, by "destructive visitors" from the British Association, meeting at Bristol. The New Botanist's-Guide states, on the authority of Mr. Babington, that a single plant of it was found in the centre of a large wood, near the 'Rocks,' Bath. Mr. Hancock reports P. officinalis from "a thicket of bushes, near Blaize Castle," north-west of Bristol.

35. ACTÆA SPICATA, *Linn.*

Area * * [3] * * * * * * 10 * 12 * * (15).
South limit in Yorkshire.
North limit in Westmoreland.
Estimate of provinces 2. Estimate of counties 2.
Latitude 53—55. Local type of distribution.
Agrarian region. Midagrarian (?) zone.

Descends to ——?

Ascends to ——?

Range of mean annual temperature, say 47 — ?

Native. Sylvestral. Apparently a true native, though very local. It is desirable that the existence of this species within the Lake province should be confirmed by more recent authority. Mr. Woodward is reported to have found the plant in "mountainous pastures above Troutbeck, near Ambleside;" and Hutchinson gives the locality of "Sandwicke, Ulleswater." The locality of Thorndon, in Essex, recorded by Blackstone, cannot still be retained without confirmation. Mr. Campbell considered the locality of "Cleish woods," to be one to which this and various other garden plants had been introduced. He mentions, in example, Valeriana pyrenaica, Doronicum plantagineum, Scrophularia vernalis, Linaria Cymbalaria, Arabis Turrita and Meconopsis cambrica. I am without information respecting the altidudes of its localities, and consequently at a loss to give the range of zones and temperature.

36. NYMPHÆA ALBA, *Linn.*

Area, general.

South limit in Cornwall, Hants, Kent.

North limit in Shetland, Sutherland, Hebrides.

Estimate of provinces 18. Estimate of counties 70.

Latitude 50—61. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 350 or 400 yards, in Lake province.

Range of mean annual temperature 52—45.

Native. Lacustral. Distributed rather generally through Britain, and yet often absent from tracts sufficient to consti-

tute the area of local list or flora. Perhaps least frequent in the provinces of Tyne and East Lowlands, and least recorded from that of the West Highlands. NB. In the Phytologist, first volume, page 525, Mr. Pamplin called attention to a variety "minor," said to have been found between York and Doncaster, and between Lyndhurst and Brockenhurst, in Hampshire. In 1843, Mr. Borrer sought unsuccessfully for the variety in the latter locality. I have observed plants in Cheshire, Cumberland and the Highlands, distinguishable by their smaller leaves and flowers.

37. NUPHAR LUTEA, *Sm.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Dorset, Kent.
North limit in Aberdeenshire and Islay.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in Channel province.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperatare 52—47.

Native. Lacustral. Distribution more limited than that of the Nymphæa. The present may be more frequent in England, but becomes so scarce in the Highland provinces, as almost to justify its assignment to the English, or southern, type of distribution. The Rev. G. Gordon supposes it an introduced plant in Moray. Dr. Dickie reports it as a native of Aberdeenshire; and on faith of the few localities in this latter county, its northern limit is taken above the line of 57°. Perhaps the range of mean temperature should be carried down to 46°. Ascends, so far as known, barely within the superagrarian zone; while the

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Nymphæa almost crosses that zone. NB. There is a variety 'minor' of this Water-lily also; for some notes upon which, see the next species.

38. NUPHAR PUMILA, *De C.*

Area [* 2 * * * * * * * * 11 * 13 *] 15 16.
South limit in Perthshire and Aberdeenshire.
North limit in Moray and Argyleshire.
Estimate of provinces 2. Estimate of counties 4.
Latitude 56—58. Highland or Local type of distribution.
Agrarian region. Superagrarian (?) zone.
Descends to —— ?
Ascends to —— ?
Range of mean annual temperature, say 45—44.

Native. Lacustral. Apparently limited to four counties of the East and West Highlands; namely, Perth, Aberdeen (Dr. Dickie), Moray or East Inverness, and Argyle shires. Besides these two Highland provinces, the Nuphar pumila has been reported to grow in three others. There can be no hesitation about rejecting the alleged locality of "a pond at Purbeck," in Dorsetshire. For many years past, the locality of "Chartner's Lough," in Northumberland, has been adopted on the faith of Mr. Winch; who, however, had intimated that the plant from that locality, after removal into the gardens at Wallington, scarcely differed from the common species, N. lutea. A specimen in my herbarium, from Sir W. C. Trevelyan, appeared to confirm this transformation; but Mr. Borrer has lately explained that the Northumberland plant is not the N. pumila, but rather a small variety of N. lutea. I know not whether the specimen, in my herbarium, came from Chartner's Lough or the Wallington gardens. In size of flower

and leaf it corresponds more closely with the Highland N. pumila; while in the shorter (ten) rays of the stigma, and in its repand margin, the specimen is certainly more like N. lutea.

39. PAPAVER HYBRIDUM, *Linn.*

Area 1 2 3 4 5 * 7 * * 10 11.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Durham, Flint, Caernarvonshire.
Estimate of provinces 9. Estimate of counties 25.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—48.

Colonist. Agrestal. Locally scattered over a considerable part of England, on chalk or other calcareous ground; being found wild to Durham and Caernarvonshire, and reported from Northumberland and Flintshire also. I mark this and the other common species, as 'colonists,' under the idea that they owe their introduction to agriculture, and might even yet scarcely keep their hold of British ground without the aid of human labour, in preparing the soil for them. Compared with our more ordinary weeds, the poppies have an exotic character in their large and gaily coloured flowers, and in their sensibility to frost.

40. PAPAVER ARGEMONE, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 * 14 15 16 17 18.
South limit in Cornwall, Isle of Wight, Kent.

North limit in Ross-shire and North Uist.
Estimate of provinces 18. Estimate of counties 75.
Latitude 50—58. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature, 52—46.

Colonist. Agrestal. Mr. Babington marks this one as possibly introduced, while he gives the other three corn poppies as true natives. I do not, however, see any reason for putting this one into a different degree or place of citizenship from the other three, though it may be something less common than Rhœas or dubium. I find no authority for its occurrence in the West Lowlands, though the fact can scarce be doubted.

41. PAPAVER DUBIUM, *Linn.*

Area, general.
South limit in Devon, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 200 yards or upwards in England.
Range of mean annual temperature 51—45.

Colonist. Agrestal. Though less frequent than P. Rhœas, in some parts of England, this becomes much more plentiful than that species, in Scotland; so that, with reference to Britain in the whole, the P. dubium may be accounted the commonest species of its genus. Perhaps it might to be set down a true 'native.' In all likelihood it

will occur in corn-fields almost as high as corn is cultivated; but either the clean farming or the humid climate renders it scarce in the Highland valleys. I think to have seen it to 300 yards in Wales. The true south limit will probably be in Cornwall.

42. PAPAVER RHŒAS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * * (18).
South limit in Cornwall, Isle of Wight, Kent,
North limit in Aberdeenshire and about Glasgow.
Estimate of provinces 16. Estimate of counties 75.
Latitude 50—58. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Colonist. Agrestal. An abundant plant in most parts of England; less so in Scotland; scarce in the Highlands. The Rev. G. Gordon doubts whether it is wild in Moray, and thinks it "has little or no claim to be considered a north country plant." On the other hand, Mr. Edmondston declared it to be perfectly indigenous in Shetland; and it is included in Dr. Gillies's Flora of Orkney, on the faith of Mr. Lowe's list. Dr. Dickie says that it is frequent about Aberdeen. I do not find the name in the lists of species seen by myself in Dumbarton, Stirling, Perth, Forfar, Aberdeen (Braemar), Moray, Ross, Caithness, and Sutherland shires. Can scarcely be deemed a plant of the superagrarian zone; though it may occur just within the strict limits, by its localities in Aberdeenshire, &c.

43. PAPAVER SOMNIFERUM, *Linn.*

Area (1 2 3 4 5 * * 8 * 10 11 * 13 * 15 16).

Alien. This exotic has been allowed place in the lists of British plants from the time of Ray, though mostly marked with the foreigner's brand. The seeds will retain their power of vegetation, many years, buried in the ground; and hence it frequently occurs, for a season or two, on soil thrown out of deep diggings, about canals, railways, &c. It is, too, more or less a weed in most old gardens, and the seeds are carried with garden refuse to the banks of rivers, road-sides, the sea shore, &c. But there can be no question about its originally exotic origin; and I know not that it can be fairly considered established as the permanent occupant of any locality in Britain.

PAPAVER NUDICAULE, *Linn.*

Incognita. Under a somwhat hasty confidence in the accuracy and scientific caution of a botanist, against all natural probability, this arctic species was figured in English Botany, and duly described in the British Flora, as a true native of the south-west of Ireland. It is now discarded by general consent.

44. MECONOPSIS CAMBRICA, *Vig.*

Area 1 * * * * 6 7 * * 10 * 12 (13 14 15).

South limit in Devon and Somerset.

North limit in Cumberland and Yorkshire.

Estimate of provinces 5. Estimate of counties 10.
Latitude 50—55. Atlantic type of distribution.
A. A. regions. Midagrarian—Inferarctic zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 700 yards, in Caernarvonshire.
Range of mean annual temperature 48—41.

Native. Rupestral or Sylvestral. Native in the counties of Devon, Somerset, Brecon, Montgomery, Merioneth and Caernarvon; possibly so, in Yorkshire, Westmoreland and Cumberland. Reported from those of Denbigh and Dumfries; but in these it may not be truly native. Introduced to the counties of Edinburgh, Kinross, Aberdeen and Moray. Mr. Borrer deems it indigenous in the Lake province, where Mr. Winch thought it introduced. The Cumberland localities in which I have observed it, were suspicious from their proximity to houses and gardens; and I give it as a native of that province on account of Mr. Borrer's opinion, who may have seen more reliable localities. It thrives and seeds freely in Surrey, where somewhat shaded by trees or walls, in gardens.

45. CHELIDONIUM MAJUS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 (15 16).
South limit in Cornwall, Isle of Wight, Kent.
North limit about Edinburgh and Glasgow.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Denizen. Septal or Viatical. Frequent in England;

and yet so constantly in the neighbourhood of old houses, gardens, orchards and other suspected places, that we can scarcely receive it for a genuine native. In Scotland, it is rather an alien than even a denizen; but I have ventured to make it an established plant northward to the Clyde and Forth; being somewhat less rigid with respect to species entered simply as denizens, than in the cases of species which are allowed to be native in some part of Britain. Of these latter, I give as nearly as possible the *native* limits.

46. GLAUCIUM LUTEUM, *Scop.*

Area 1 2 3 4 5 6 7 * 9 10 11 12 13 14 15 16 * (18).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Fife, Dumbarton, Argyleshires.
Estimate of provinces 16. Estimate of counties 30.
Latitude 50—57. British (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, at the coast level, to the West Highlands.
Range of mean annual temperature 52—48.

Native. Littoral. Frequent on the coast of England, but decreasing so much northward, that it might almost as truly be referred to the English, as to the British type of distribution. While there appear to be no other ascertained localities more north than the shores of the Forth and Clyde, I have hesitated to receive the Shetland Flora as a sufficient authority for this plant being indigenous in the North Isles. The maritime plants of the Trent province being simply those of Lincolnshire, for which we possess no satisfactory floral catalogue, I have thought it more probable that the Glaucium luteum does occur in that province,

notwithstanding the want of a recorded locality for the plant there.

GLAUCIUM PHŒNICIUM, "*Gaert.*" "*Crantz.*"

Incognita. We are told by Hudson, that this shewy plant was sent with G. violaceum from the county of Norfolk; and it has also been reported to occur in Dorsetshire. No botanist of this century appears to have found it wild. In gardens, it is still occasionally cultivated as an ornamental annual, and was more in favour formerly; so that its temporary appearance on the coast, or in cultivated ground, may be readily accounted for.

47. GLAUCIUM VIOLACEUM, *Juss.*

Area (* * * 4).

Alien. Has been established, for a century and upwards, as an agricultural weed in Cambridgeshire and Norfolk; so that it might be now held a 'colonist' with little more looseness in the application of that term, than has been made in the case of Delphinium Consolida. Apparently, however, the present plant is more sparsely scattered within its still more restricted area. I have seen a stray specimen or two in the parish of Thames Ditton; but it is not at all an established weed within that parish.

48. CORYDALIS CLAVICULATA, *De C.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Devon, Isle of Wight, Kent.

North limit in Ross-shire and Argyleshire.

Estimate of provinces 17. Estimate of counties 50.

Latitude 50—58. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Channel.

Ascends to 400 yards, on Dartmoor, in the Peninsula.

Range of mean annual temperature 50—46.

Native. Rupestral or Sylvestral. Though widely distributed through Britain, this is far from being a common plant; and apparently it becomes very scarce in the West and North Highlands, and is not reported from any of the North Isles. Its situations of growth vary; being found in thick woods, more open coppices, in stony places, on thatched roofs, and on trees; but, for the most part, it is a plant of damp and loose soil, and shady places.

49. CORYDALIS LUTEA, *Lindl.*

Area (1 2 3 4 5 6 * 8 9 10 11 * * * 15).

Alien. Occasionally found on ruins, old walls, banks near gardens, and such like situations; apparently having formerly been a more favourite ornamental plant, than is the case at the present time.

CORYDALIS SOLIDA, *Sm.*

Area (* * * * 5 * * * 9 * * 12).

Alien. Much less established than the preceding species; but has been admitted into English lists, by botanists who were more solicitous to publish novelties, than to promulgate truth; and once admitted into books, no one likes to take the lead in discarding it again.

50. FUMARIA CAPREOLATA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Sutherland, Hebrides.
Estimate of provinces 18. Estimate of counties 70.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—46.

Native? Agrestal, &c. Inhabits cultivated ground; as also way-sides and hedge-banks; and while far from universal, is still a moderately frequent plant in Britain; probably, inclining to the west and north, rather than to the south-east of England. A question arises, whether the species of this genus should be set down as 'natives' or as 'colonists.' There is something about them which looks unlike British weeds, giving to them an elegant and exotic appearance; they are susceptible of frost, and they scarcely grow save in spots where the ground has been more or less prepared for them by the operations of mankind. Still, they are so thoroughly established, that it may seem an excess of sceptism or scrutiny, to question their claims to nativity in Britain.

51. FUMARIA OFFICINALIS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland and Orkney.

Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in East Highlands.
Range of mean annual temperature 52—45.

Native? Agrestal, &c. Abundant in cultivated ground, and also pretty frequent by way-sides and on hedge-banks, where its more rampant growth leads to its being mistaken for F. capreolata; from which it is readily distinguished by the very broadly dilated, and almost orbicular, extremity of (particularly) the lower petal; which, in F. capreolata, is narrowly spoon-shaped, and ladle-shaped in F. officinalis. The present species decreases northwardly, and is apparently scarce in the West Highlands; being omitted from lists of plants observed in Isla and Cantire, by Professor Balfour, about Locheil and Fort William, by myself; as also from Balfour and Babington's Hebridean list. It must be the species intended under name of F. parviflora, in Edmondston's Shetland list, published in the Annals of Natural History.

52. FUMARIA MICRANTHA, *Lag.*

Area * * 3 * 5 * * * * * * * * * 14 15.
South limit in ——?
North limit in ——?
Estimate of provinces (10)? Estimate of counties (50)?
Latitude (52—57)? British (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Thames province.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature (49—47)?

Native? Agrestal. Having, been only recently distinguished in books from the preceding and succeeding species, this one has been seldom recorded by name, or in such way as to make its localities correctly understood. I have collected it in different parts of Surrey. Mr. Babington has sent me a specimen from Shropshire; and Mr. Brand has communicated others from Edinburgh. The same species is also stated to grow in Kent, Haddingtonshire and Forfarshire. I have assumed that it will be found also in most of the intermediate counties and provinces.

53. FUMARIA PARVIFLORA, *Lam.?*
54. FUMARIA VAILLANTII, *Lois.*

Area [1] 2 3 4 * * * * * 10 * * * 14 15 * * [18].
South limit in —— ?
North limit in —— ?
Estimate of provinces (12)? Estimate of counties (55)?
Latitude (50—57)? British (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, or nearly so.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature (50—47)?

Native? Agrestal. For reasons similar to those mentioned under the preceding species, the distribution of this present one cannot be satisfactory indicated. I possess specimens only from Essex (Mr. Gibson), Cambridgeshire (Mr. Babington), and Edinburgh ("T. B. B."—Sir W. J. Hooker). As far as the names can be any guide, the species occurs also in the counties of Devon, Dorset, Sussex, Kent, Surrey, Suffolk, Norfolk, York, Forfar, Moray and Shetland; but F. officinalis was mistaken for this species, in the localities published for it some years ago, in Devon,

Sussex, and Shetland. I remain unaquainted with any evidence or argument sufficing to show that we have more than one species under the two names of parviflora and Vaillantii, after separating micrantha therefrom.

55. CAKILE MARITIMA, *Scop.*

Area 1 2 3 4 * 6 7 * 9 10 11 12 13 14 15 16 17 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 50.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends, on the coast level, to the Peninsula.
Ascends, on the coast level, to the North Isles.
Range of mean annual temperature 52—46.

Native. Littoral. Pretty frequent all around the coast line of Britain, and probably found in almost every littoral county. Between fifty and sixty of our counties are sufficiently accessible to the salt-water tides, for the production of littoral plants; and accordingly, I take the estimate of "50" for those species which are supposed to occur in nearly every maritime county. This estimate may be a few over or a few under truth, in some instances; but the error would probably be rendered wider by substituting "40" (which would be nearer to ascertained knowledge) or "60" (which would go beyond what is probable). As before intimated, it would be only an affectation of exactness, to estimate in units the counties for such species as occur in more than 30 and fewer than 70.

56. CRAMBE MARITIMA, *Linn.*

Area 1 2 3 4 * 6 7 8 * 10 * 12 13 14 * 16.
South limit in Devon, Sussex, Kent.
North limit in Linlithgowshire and Islay.
Estimate of provinces 12. Estimate of counties 25.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends, on the coast level, to the Peninsula.
Ascends, on the coast level, to the West Highlands.
Range of mean annual temperature 52—48.

Native. Littoral. Rather thinly scattered along the coasts of England and the Lowlands; and becoming decidedly less frequent northwards. Probably more plentiful on the west, than on the east side of the island.

CRAMBE ORIENTALIS, *Linn.*

Area (* * * * * * * * * * * * * * * 15).

Alien. "Escaped and wild, but not indigenous, at the bridge of Spey, near Fochabers"—Rev. G. Gordon, in New Botanist's Guide.

57. CORONOPUS DIDYMA, *Sm.*

Area 1 2 (3 * 5) 6 7 * * (10 11).
South limit in Cornwall and Isle of Wight.
North limit in Caernarvonshire and Hants or Sussex.
Estimate of provinces 4. Estimate of counties 10.
Latitude 50—54. Atlantic type of distribution.

Agrarian region. Inferagrarian zone.

Descends to the sea level, in the Peninsula.

Ascends to 50 or 100 yards, in the same province.

Range of mean annual temperature 52—49.

Native. Viatical. May be held a native in the counties of the south and west coasts of England, as indicated by the limits assigned. In the inland counties of Surrey, Herts and Stafford, it can be considered only as a straggler originally from gardens. On the ballast hills of Tyne, it must equally be held an introduced plant. The locality of "Scarborough," on the authority of Robson, needs more modern confirmation, before it can be received for a native habitat. Is the locality of Danbury, in Essex, a native one?

58. CORONOPUS RUELLII, *Sm.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Moray and Wigtonshire.

Estimate of provinces 15. Estimate of counties 50.

Latitude 50—58. English type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 50 or 100 yards, in England.

Range of mean annual temperature 52—47.

Native. Glareal and Viatical. Rather plentiful in the south of England; decreasing northwards; and becoming quite local in Scotland, where it occurs in a few spots on the east coast; as also at Portpatrick in the south-west, whence Professor Balfour has favoured me with a specimen.

59. ISATIS TINCTORIA, *Linn.*

Area (1 * 3 4 5 * * * 9 * 11 * * 14 15 16).

Alien. Has been repeatedly found in a half-naturalised state; and yet it can scarce be said to have acquired so permanent a possession of its localities as would justify its reference to the category of denizens. In 1825, Mr. Pamplin found it "among the stone-pits near Guildford, in great abundance;" and in 1841, it was observed by Mr. Mill "growing in prodigious luxuriance in chalk quarries, close to the town of Guildford." I have specimens, through the Botanical Society of London, collected by Mr. Brewer, at "Albury, near Guildford." Professor Balfour finds the plant in Haddingtonshire and Fifeshire. And localities in other counties may be found recorded in the Botanist's Guides; but in how many of such localities the plant itself would now be found, I cannot venture to say or guess.

60. THLASPI ARVENSE, *Linn.*

Area 1 2 3 4 5 6 * 8 9 10 11 12 13 14 15 16 17 18.
South limit in Devon, Isle of Wight, Kent.
North limit in Orkney and Sutherland.
Estimate of provinces 18. Estimate of counties 60.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Colonist. Agrestal. Widely, but rather thinly, scattered over Britain from the south to the north coast. Though I have collected specimens, and taken down lists of the plants, as seen by myself, in a goodly number of our counties, I seem to have met with this species only twice; namely, in Fife and Sutherland. I should thus, from my own eyes, have deemed it much rarer than appears to be the fact; since my compilation of notes includes localities for it in forty-five counties. The difference here may in part be attributable to the circumstance of my own botanical wanderings having inclined more to the mountains and other wilder places, than to the corn fields.

61. THLASPI PERFOLIATUM, *Linn.*

Area * * 3 * 5 * * * * * [10 * 12].
South limit in Oxfordshire and Gloucestershire.
North limit in the same counties.
Estimate of provinces 2. Estimate of counties 2.
Latitude 51—52. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends to —— ?
Ascends to —— ?
Range of mean annual temperature (48) ?

Native. Rupestral ? An extremely local plant, the area of which has been greatly extended through misapplications of the name. Apparently it is quite limited to the two adjoining counties, indicated above for the south and north limits. But the dividing line between those counties, being also the dividing line between the eastern province of Thames and the western province of Severn, the species will stand proportionably higher in a provincial census, than in one founded on counties. I cannot state anything

exact, concerning the altitude or local situations, in which this Thlaspi is found, and am consequently uncertain also as to the temperature. T. alpestre was the species intended under the name of this one, in the Botanist's Guide and earlier works, referring to the localities in the Humber and Lake provinces.

62. THLASPI ALPESTRE, *Linn.*

Area 1 * [3] * * 6 7 8 * 10 11 12 * * 15.
South limit in Devon and Derbyshire.
North limit in Cumberland and Forfarshire.
Estimate of provinces 8. Estimate of counties 12.
Latitude 50—57. Highland (?) type of distribution.
A. A. regions. Midagrarian—Midarctic zones.
Descends to ——? (Say, to 150 or 200 yards, in England.)
Ascends to ——? (Say, about 800 yards, in Scotland.)
Range of mean annual temperature 47—40.

Native. Rupestral. Though suggestively assigned to the Highland type, as a plant ascending high on the Grampians, and in England affecting the hilly counties almost exclusively; yet this species is really very scarce in the Highland provinces, and runs more southward than other plants assigned to the same type. Its chief prevalence appears to be on the limestone hills of the north of England, where its 'rupestral' character passes almost into the 'pascual.' In Wales, according to the late Mr. J. E. Bowman, it ascends into the lower arctic zone; and I suppose the locality in Glen Isla, Forfarshire, to be within the midarctic zone. Possibly, the range of temperature runs both higher and lower than the degrees indicated; certainly lower, if the altitude of 800 yards is exceeded in Scotland. The Thames province is indicated [3] merely because the Ox-

fordshire T. perfoliatum has been occasionally mis-named T. alpestre. A limestone plant (See Hutchinsia).

63. CAPSELLA BURSA-PASTORIS, *De C.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 yards, in East Highlands.
Range of mean annual temperature 52—43.
Native. Agrestal and Viatical. Most plentifully distributed throughout the cultivated lands, and very frequent also by road-sides; a weed in almost every garden.

64. HUTCHINSIA PETRÆA, *Linn.*

Area 1 * (3) * 5 6 7 8 * 10.
South limit in Somerset and Pembrokeshire.
North limit in Yorkshire and Denbighshire.
Estimate of provinces 6. Estimate of counties 10.
Latitude 51—55. Local type of distribution.
Agrarian region. Inferagrarian—Superagrarian zone.
Descends, probably, to a slight altitude in South Wales.
Ascends to about 450 yards, in North Wales.
Range of mean annual temperature 49—44.
Native. Rupestral. On limestone rocks, and about walls, in the western provinces, and hilly (westerly) sides of the two north-eastern provinces of England, those of the

Humber and Trent. Besides these, there is an isolated locality, familiar to Metropolitan botanists; namely, the wall of Eltham church-yard, in Kent; to which it may likely have been introduced. The altitude of 450 yards is intended for the locality of Eglwyseg Craigs, in Denbighshire, which are said to have an altitude of 1688 feet; but I do not recollect that the Hutchinsia attains quite to their summit, although it ascends higher than Castle Dinas Bran. Among the species referred mostly to the local type in this work, there are some whose distribution coincides nearly with the limestone tracts of the west and north of England and Wales. Geographically, their type is intermediate between the Highland and Atlantic. These may ultimately be taken as a small group of themselves, whose geograpical areas are modified by the nature of the rocks on which they grow, more than by climate. The Hutchinsia may be taken as a fair example of this small group; and Draba muralis is another. Thlaspi alpestre comes a step nearer to the true Highlanders, by one outlying locality, in Forfarshire; and Dryas octopetala is a converse example, of a truly Arctic or Highland species shading off into this group. Cardamine impatiens, notwithstanding its locality in Surrey, essentially belongs to the group. And though extremely local examples, Draba aizoides, Arabis stricta, and Thlaspi perfoliatum may associate there also. The group may be distinguished as the 'Anglo-Cambrian' subdivision of the local type.

65. TEESDALIA NUDICAULIS, *Br.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.
South limit in Cornwall, Hants, Kent.
North limit in Moray and near Glasgow.

Estimate of provinces 16. Estimate of counties 50.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to, probably, 300 yards, in North Wales.
Range of mean annual temperature 52—45.

Native. Glareal and Rupestral. The Teesdalia has usually been classed among the 'rarer plants;' and yet the distribution, as above set forth, shows an area and range much wider than given for many other species which have been held among the 'commoner plants.' For instance, let the distribution of this species and that of the Clematis be compared together, and it will be found nearly double for the present one; yet in Turner and Dillwyn's guide, the Clematis was not included, while the Teesdalia was so. Its comparatively spare and restricted distribution in Scotland, over much of which it is yet unfound, gives something of an English character thereto; although it is still nearer to the British (general) than to the English (southern) type of distribution.

66. IBERIS AMARA, *Linn.*

Area (1) * 3 4 * * * * * (10 11 12 13 14).
South limit in Berks, Bucks, Essex.
North limit in Norfolk, Bedfordshire, Oxfordshire.
Estimate of provinces 2. Estimate of counties 6.
Latitude 51—53. Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to (or near) the coast level.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature, say 49—48.
Colonist. Agrestal. According to published reports of

localities, it would appear that the Iberis is well established in Berkshire, Oxfordshire and Buckinghamshire; partially so in the corn fields of Hertfordshire, Bedfordshire, Cambridgeshire and Essex. But in other parts of England, beyond the two provinces which embrace these counties, it is scarcely more than an occasional straggler. Its proper position seems to be nearer to the 'alien' than to the 'native' side of the intermediate category of 'colonists.'

67. LEPIDIUM LATIFOLIUM, *Linn.*

Area (1 2) 3 4 * 6 7 * 9 10 (11 * 13 14 15).
South limit in Somerset, Sussex, Kent?
North limit in Yorkshire and Anglesea?
Estimate of provinces 6. Estimate of counties 10.
Latitude 52—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Thames.
Ascends to a trifling elevation.

Native? Littoral, &c. Localities for this plant have been recorded from twenty counties or upwards; but several of these being close by old castles and other suspicious spots, or accompanied by remarks in doubt of their being truly native habitats, I have conceived it the better course to reject many of them. The coast localities, in a few eastern counties, seem to have the best claim to be received as natural and native; but I let some of the western provinces stand above, without inclosure, until further investigation.

68. LEPIDIUM DRABA, *Br.*

Area (* * 3 * 5 6 * * 9).

Alien. Has been found in Thanet, Kent, and also near Bristol, Swansea, Powick and Chester.

69. LEPIDIUM SMITHII, *Hook.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Sussex.
North limit in Moray and Dumbartonshire.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 yards, in East Highlands.
Range of mean annual temperature 52—43.

Native. Viatical, &c. Perhaps fully as frequent as the L. campestre, though usually classed among the rarer species, by reporters of localities. It is likely that the one is often mistaken for the other of these two species, and that the name of 'L. campestre' is used, when species 'L. Smithii' is intended. I found it in the bed of the Dee, at Castletown, the only elevated spot in which I have observed it.

70. LEPIDIUM CAMPESTRE, *Br.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray and about Glasgow.

Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—46.

Native. Agrestal, &c. Though more an agrestal plant than aught else, this occurs on banks and pasture ground in clayey soil, and by road-sides, like the L. Smithii. As far as my compilations of their localities go, the present species occurs in forty-two counties, and L. Smithii in forty; but I estimate their actual distribution considerably higher.

71. LEPIDIUM RUDERALE, *Linn.*

Area 1 2 3 4 5 (6 * * * 10 11 * * * 15).
South limit in Cornwall, Hants, Kent.
North limit in Norfolk and near Bristol.
Estimate of provinces 6. Estimate of counties 12.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, about the coast level, to the Ouse.
Range of mean annual temperature 52—49.

Native. Littoral. Not strictly a maritime species, and yet scarce wild in this country except along the coast, from Norfolk round to Bristol. In South Wales and the province of Tyne, the habitats are expressly restricted to "ballast hills" or "ballast banks;" and in Yorkshire, the locality of "Scarborough pier," on old authority only, looks suspicious. I have estimated the provinces to be six, however, on the likely supposition that a coast plant, said to be frequent

about Bristol, will be found in South Wales, in some less questionable spot than that of a ballast bank.

72. COCHLEARIA OFFICINALIS, *Linn.*

Area, general (around the coast).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Sutherland.
Estimate of provinces 18. Estimate of counties 50.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends, on the coast level, to Shetland.
Range of mean annual temperature 52—46.

Native. Littoral. Pretty frequent round the coast of Britain though doubtless the name is often applied to one or other of the following varieties or species, by which this is made to appear proportionally more common. Here, I restrict the name of 'officinalis' entirely to the shore plants, and to those merely naturalised inland, through cultivation; not feeling satisfied that any of the wild inland and mountain examples really belong to the form here intended under that name. Still, while deeming it better to treat their distribution separately, I am far from satisfied that all four are not forms of a single species. By C. officinalis, I understand the shore plants with globose silicles; but I cannot say what forms other botanists may include under the same name.

72,b. COCHLEARIA ALPINA, (*Sweet?*)
COCHLEARIA GRŒNLANDICA, (*With.?*), *Sm.*

Area * [2] * * * * 7 8 * 10 11 12 [13] * 15 16 * 18.
South limit in Caernarvonshire and Yorkshire.
North limit in Moray, West Inverness-shire, Shetland?
Estimate of provinces 9. Estimate of counties 20.
Latitude 53—61. Highland type of distribution.
A. A. regions. Superagrarian—Superarctic zones.
Descends to the coast level, in Shetland?
Ascends to 1300 yards, in East Highlands.
Range of mean annual temperature 45—34.

Native. Rupestral. Under this head I intend certain mountain examples of a Cochlearia, which have often been referred to C. officinalis, frequently also to C. groenlandica, occasionally to C. danica. Though a variable plant, and mimicking the shore examples both of officinalis and danica, here of one, there of the other; yet, on the whole, it appears to myself to come nearer to danica than to officinalis, chiefly by the more elliptic silicle and angular leaves. It is doubtless the C. officinalis, var: alpina, of Babington's Manual; though probably including also forms which that author would deem to be C. officinalis in its more typical state.

72,c. COCHLEARIA DANICA, *Linn.*

Area 1 2 3 4 (5) 6 7 * 9 * 11 12 * 14 15 16 * 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland (Neill; Edmondston).
Estimate of provinces 15. Estimate of counties 40.

Latitude 50—61. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends, at the coast level, to Shetland.

Range of mean annual temperature 52—46.

Native. Littoral. Reported from thirty counties, but as it is doubtless often confused with the globose-fruited C. officinalis, I put the estimate a step higher in my series. With the two authorities above cited, in addition to Lowe's Orkney list, I have not felt myself at liberty to exclude the North Isles from the area of this species, although it would be desirable to obtain some confirmatory evidence of its occurrence therein.

72, d. COCHLEARIA ANGLICA, *Linn.*

Area 1 2 3 4 5 6 7 [8] 9 * 11 * 13 14 15 16.

South limit in Devon, Isle of Wight, Kent.

North limit in Moray and Argyleshire.

Estimate of provinces 14. Estimate of counties 30.

Latitude 50—58. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends, on the coast level, northward to Moray.

Range of mean annual temperature 52—47.

Native. Littoral. Less frequent, and perhaps more of a marsh plant, than either of the two preceding shore species. I must confess, however, that I find difficulty in fully distinguishing the specimens, in some instances; the present apparently passing to danica, on one side, and to officinalis, on the other. Though this may likely enough be found on the coast of Lincolnshire, I reject the Trent pro-

vince, because, as yet, Derbyshire is the only county from which I find the name of this species recorded, and the Derbyshire plant is alpina or officinalis, not anglica.

73. ARMORACIA RUSTICANA, "*Fl. Wett.*"

Area (1 2 3 4 5 6 7 8 * 10 11 * 13 14 * * * 18).

Alien. The difficulty of eradicating the horse-radish after it has once become established, is familiar to most gardeners. No wonder, therefore, that it should acquire and keep such hold of the ground in places where it is little disturbed, as really to appear very like a genuine native. Perhaps we might now look upon it as a denizen.

74. SUBULARIA AQUATICA, *Linn.*

Area * * * * [5] * 7 * * * * * * * 15 16 17.
South limit in Anglesea and Caernarvonshire.
North limit in Sutherland and Ross-shire.
Estimate of provinces 4. Estimate of counties 10.
Latitude 53—59. Highland type of distribution.
A. A. regions. Midagrarian—Midarctic zones.
Descends to a slight altitude, in North Wales.
Ascends to 700 yards, in East Highlands.
Range of mean annual temperature 47—39.

Native. Lacustral. A scarce species, though it may seem more so than is fact, on account of the nature of its habitat and the diminutive size of the plant. The Severn province is mentioned on the authority of Mr. Aiken, who has perpetrated so many blunders in reference to the Botany of Wales, as to render everything doubtful which stands on the faith of his accuracy.

75. DRABA AIZOIDES, *Linn.*

Area * * * * * 6.
South limit in Glamorganshire.
North limit in the same county.
Estimate of provinces 1. Estimate of counties 1.
Latitude 51—52. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends to ——?
Ascends to ——?
Range of mean annual temperature (50)?

Native. Rupestral. Apparently limited to the peninsula of Glamorganshire, which stretches westward from Swansea. The stations are reported at eight miles (Pennard Castle rocks), and sixteen miles (Wormshead) distant from Swansea. It seems singular to find this Alpine and Pyrenean species thus isolatedly located on the coast of Wales. Those who have visited the spot, appear to acknowledge the stations as truly native. I am unable to speak to this from my own observation; South Wales being as yet an unvisited province.

76. DRABA RUPESTRIS, *Br.*

Area * * * * * * * * * * * * * * 15 * 17 [18].
South limit in Perthshire and Moray.
North limit in Sutherland.
Estimate of provinces 2. Estimate of counties 3.
Latitude 56—59. Highland type of distribution.
Arctic region. Superarctic zone.
Descends to (say, 900 yards) in North Highlands.

Ascends to 1300 yards, in East Highlands.

Range of mean annual temperature 36—34.

Native. Rupestral. Very local; being yet known only from the Bredalbane mountains, in Perthshire; from Ben Hope, in Sutherland; and from Cairngorm, where the county of Aberdeen joins Moray, or the eastern side of Inverness. On Ben Lawers the altitude is about 1300 yards, something more and something less; possibly descending nearly to 1200 yards. But Dr. Graham reports that he saw fine plants of it on another hill in the same range, probably of lower elevation than 1200 yards. The altitude of Ben Hope, in Sutherland, being scarcely 1000 yards, I have taken 900 as a rough guess at the altitude of the plant, found by Mr. Macnab, on that hill. So far as known in a wild state, this is one of our most thoroughly alpine or arctic species; and yet it seeds freely, and thus multiplies itself, in my garden in Surrey, where there is a partial protection from the sun in summer, or the ground is watered in dry weather. D. incana affords a second example of this easy adaptation to a different climate, though the difference of temperature is much narrower in its case. The Orkney specimens belong to D. incana, not to D. rupestris.

77. DRABA INCANA, *Linn.*

Area * * * * * * 7 [8] * 10 11 12 * * 15 16 17 18.

South limit in Caernarvonshire and Yorkshire.

North limit in Shetland, Orkney, Sutherland.

Estimate of provinces 8. Estimate of counties 15.

Latitude 53—61. Highland type of distribution.

A. A. regions. Superagrarian—Superarctic zones.

Descends to the coast level, in North Highlands.

Ascends to 1100 yards, in East Highlands.

Range of mean annual temperature 46—36.

Native. Rupestral. A mountain species in Britain; yet descending low down, even in England (say, to 200 or 250 yards), on limestone rocks; and on the limestones of Sutherland it descends to the sea cliffs. But, like other plants which are obviously influenced in their distribution by the contiguity of limestones, this one does not appear to be quite restricted to calcareous rocks. Mr. Tatham says that it is "abundant close to Settle;" but I know not whether this means on the same level (less than 200 yards of altitude) as that town. In the midland Flora, the neighbourhood of Buxton is given as a locality for this species, on the authority of the Rev. Mr. Bree: is that locality correct?

78. DRABA MURALIS, *Linn.*

Area 1 * (3) [4] 5 * 7 8 * 10 * 12 * (14) [15].

South limit in Somerset and Staffordshire.

North limit in Yorkshire and Westmoreland.

Estimate of provinces 6. Estimate of counties 6.

Latitude 51—55. Local type of distribution.

Agrarian region. Inferagrarian (?)—Superagrarian zones.

Descends to ——?

Ascends to 200 or 300 yards, in N. England.

Range of mean annual temperature (say, 48—45)?

Native. Rupestral. Reported from the counties of Somerset, Stafford, Montgomery, Derby, York and Westmoreland; also from the neighbourhood of Chelsea and Edinburgh, doubtless through the botanic gardens of those places. To these we must add the Warden Hills, in Bedfordshire, and the vicinity of Forfar; but I am not aware that these two latter localities have been confirmed

by any second authority; and they are eminently suspicious until so corroborated. I am quite unprepared to assign the range of altitude, and consequently the ranges of zone and temperature also. The habitat of "East Harptree," Somerset, is probably of slight elevation; while some of those in Yorkshire may be at 300 yards or upwards. I suppose it to be 200 yards in Derbyshire.

79. DRABA VERNA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * 17 18.
South limit in Devon, Isle of Wight, Kent.
North limit in Orkney and Ross-shire.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 800 yards, or upwards, in E. Highlands.
Range of mean annual temperature 52—39.

Native. Glareal and Rupestral. My compilation of localities shows this species to have been reported from nearly fifty counties. That it grows in all, or almost all the rest, I can scarce doubt; though so small and early-flowering a plant is overlooked by summer tourists. I have traced the species to 400 yards up the Grampians. In assigning it to the arctic region, and to an altitude of 800 yards or upwards, I am taking in the variety found by Sir William Hooker "on rocks near the lake upon Ben Lawers." I estimate that lake to be at 800 yards (some say, nearer 1000 yards) of elevation above the sea; being 2000 feet above Killin. For this species, as for many others indicated from Devon, the true south limit is doubtless in Cornwall, though not recorded.

80. CAMELINA SATIVA, *Crantz.* CAMELINA DENTATA, *Pers.*

Area (1 2 3 4 5 * 7 8 * 10 11 * 13 14 15 16 17 18).

Alien. Found almost throughout Britain, where flax is cultivated; and along with which the seeds of the Camelina are doubtless sown. It occurs also sometimes on ballast heaps; as, for example, those of Tyne, from which Mr. Storey has sent a specimen to my herbarium. Cannot be deemed a permanent weed in any part of Britain, as far as known to me. Mr. Babington says that C. dentata occurs along with C. sativa, and probably enough some of the reported localities, in which the latter has been supposed found, might have been assigned to C. dentata. Some botanists, not without a show of reason, hold the alleged two species to be truly one only. Yorkshire is the only county from which I have seen the C. dentata expressly reported.

81. KONIGA MARITIMA, *Br.*

Area (1 2 3 4 5 6 * * * * * * * * * 15).

Alien. It is curious that this plant, which scarcely maintains ground anywhere, even in the south of England, should have been originally admitted as a British plant on the faith of a locality, doubtless accidental and temporary, so far north as Aberdeen. Some few more localities, additional to those collected into the New Guide, have been recently published; but they are scarce worth mentioning. One of these, "wall at Newlyn, Mount's Bay," is probably the same spot on which the species was observed by myself

in 1831; the wall being a sort of terrace-boundary, which raises a flower-garden above the public road.

82. ALYSSUM CALYCINUM, *Linn.*

Area (1 * 3 4 * * * 8 * 10 * * * 14 15).

Alien. This has been reported from so many distant localities since its recent discovery in Britain, that I was by no means surprised to see the Rev. G. E. Smith contending for its claims to "a place in the native Flora of this island;" although I cannot myself feel quite warranted in admitting it as a 'colonist.'. My notes of the reported localities, take in Devon, Herts, Essex, Cambridgeshire, Leicestershire, Yorkshire, Haddingtonshire and Forfarshire. If I recollect aright, the counties of Leicester and Haddington were those first reported for this plant; and it does not appear to have shown that persistence and increase, in either of those localities, which would be expected in a native or fully naturalized species. Of the locality in Leicestershire, which had been reported under two names, Mr. Churchill Babington writes, "The two stations for Alyssum calycinum are identical. One plant (out of ten which were purposely left growing) came up the next year; and the plant has since vanished, so far as I can make out, having been probably introduced with Medicago lupulina." In 1835, Dr. Graham reported the species "profuse" on Dirleton Common, in Haddingtonshire; apparently deriving his information from Mr. James Macauly. In 1844, Mr. W. Keddie found it "in small quantities on the Common," while in company with Professor Balfour, who doubtless knew where to look for it.

"MYAGRUM ORIENTALE."
"MYAGRUM PANICULATUM."
CLYPEOLA JONTHLASPI, *Linn.*
VELLA ANNUA, *Linn.*

Incognits. These four have been reported as British, but on authority which seems to entitle them to rank only in the "incognito" class of citizenship. The two first are enumerated in Don's list of Forfarshire plants. I have mislaid my reference to the third, but think it may have been mentioned in a list of British species, wanted by Mr. Sowerby, for the Supplement to 'English Botany,' and the name occurs in the list of "excluded species," on the cover of the 'London Catalogue.' The fourth was supposed to have been found "on Salisbury Plain, not far from Stonehenge," by Mr. Lawson; and on faith of this supposition, it has been retained in our Floras of Britain several scores of years: so slow is the progress of correction where positive errors can be met only by negative disproof.

83. DENTARIA BULBIFERA, *Linn.*

Area * 2 3 * * * * * * * * * 13 [14 15].
South limit in Sussex.
North limit in Ayrshire.
Estimate of provinces 3. Estimate of counties 6.
Latitude 51—56. Local type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to —— ?
Ascends to —— ?
Range of mean annual temperature (49—47 ?)

Native. Sylvestral. Found in the counties of Sussex, Kent (if any of the Tunbridge Wells' localities are within the same county) Bucks, Herts, Middlesex and Ayr. Those of Surrey, Edinburgh and Perth have also been recorded for this local plant, but require additional confirmation. The altitudes will probably be between 50 and 150 yards; on these I can say nothing positive. Were it not for the occurrence of the Dentaria in Ayrshire, the Germanic type might have been indicated with apparent propriety; so that by a peculiar anomaly, the more extended area (or, rather, a second and separated area) throws the plant into the local type. It would seem to be a particularly local example of the English or British type.

84. CARDAMINE AMARA, *Linn.*

Area * 2 3 4 5 * 7 8 9 10 11 12 13 14 15.
South limit in Dorset, Sussex, Kent.
North limit in Moray and Lanarkshire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—46.

Native. Paludal and Sylvestral. Though widely distributed, and reported from forty counties, this can scarcely be designated a common or frequent plant. I am induced to add one to the thirteen provinces numbered above, in the estimate, on the probability of the species occurring in South Wales or the West Highlands, the plants of which are as yet very incompletely ascertained. It may eventually turn out that 60 would have been a better county esti-

mate than 50. The reported locality of Finlarig, Perthshire, may imply a temperature down to 45. Though nearer to the British, the type of distribution inclines towards the English or Germanic.

85. CARDAMINE PRATENSIS, *Linn.*

Area, general.
South limit in Devon, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1100 yards, in East Highlands.
Range of mean annual temperature 52—36.
Native. Pratal. Abundantly distributed over the meadow lands which are at all damp; occurring also about stream-sides and on wet rocks on the mountains, up to 800 or 900 yards; rarely to 1000 yards.

86. CARDAMINE HIRSUTA, *Linn.*
86, b. CARDAMINE SYLVATICA, *Link.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1000 yards, in East Highlands.

Range of mean annual temperature 52—37.

Native. Rupestral, &c. Under existing doubts respecting the specific identity or distinctness of these two plants, I should have preferred to show their distribution separately, could this have been done with any near approach to exactness. But the localities of C. sylvatica have doubtless been often recorded, in catalogues and Floras, under the name of C. hirsuta; and even with the specimens before me, I hesitate under which name to put several of the boreal and mountain localities. In my own county of Surrey, I find no such difficulty with the wild plants from walls or stream-sides. The plants of the two forms, raised from seeds brought from their wild localities, are also sufficiently distinguishable by their leaves, in my garden; though the differences are less decided, when thus growing, the one in less dry, the other in less humid situations.

87. CARDAMINE IMPATIENS, *Linn.*

Area 1 (2) 3 * 5 * 7 8 [9] 10 * [12 13 * * 16].
South limit in Surrey and Somersetshire.
North limit in Yorkshire and Denbighshire.
Estimate of provinces 6. Estimate of counties 10.
Latitude 51—55. Local type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to ——? (Below 100 yards?)
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 48—46.

Native. Rupestral. I have seen examples of this species in or from the counties of Surrey, Gloucester, Warwick, Worcester, Denbigh, Derby and York. It is reported, on good authority, from Somerset, Salop and Montgomery. I fear that the localities in several other coun-

ties are too suspicious for trust. In Sussex, it is supposed to have been introduced to the neighbourhood of Slinfold. In the provinces of Mersey and Lakes, C. sylvatica has likely been mistaken for the present species. The localities on the banks of Doune and Clyde, in the West Lowlands, seem to require confirmation. That of Arisaig, in the West Highlands, is surely an error.

CARDAMINE BELLIDIFOLIA, *Linn.*

Incognit. Reported, on old authority, from the counties of Somerset, Denbigh and York; but since this species cannot be found in any of the alleged localities, while Arabis hirsuta does occur in most or all of them, there can be little question that the Arabis was mistaken for the Cardamine.

88. ARABIS THALIANA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * 17 18.
South limit in Devon, Isle of Wight, Kent.
North limit in Orkney and Ross-shire.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 200 or 300 yards, in Lake province.
Range of mean annual temperature 51—45.

Native. Rupestral, &c. In various situations, as cultivated ground, banks, walls, rocks, and even in woods, where the vegetation is thin. Reported from forty-four

counties, and likely enough to be found in almost all of the rest, if looked for.

89. ARABIS PETRÆA, *De C.*

Area [1 * * * 5 6] 7 [8 * 10] * 12 * * 15 16 17 18.
South limit in Merionethshire and Caernarvonshire.
North limit in Shetland, Hebrides, Sutherland.
Estimate of provinces 6. Estimate of counties 12.
Latitude 53—61. Highland type of distribution.
A. A. regions. Superagrarian—Superarctic zones.
Descends below 300 yards, in E. Highlands (Dickie).
Ascends to 1400 yards, or upwards, in same province.
Range of mean annual temperature 44—33.

Native. Rupestral. As will be observed, I hesitate to give this species a provincial area so wide as its reported localities would indicate; five provinces being excluded, on account of their uncorroborated or vaguely stated localities. Hudson records it from Devonshire, which appears little likely. Aiken pretends that he found it a mile from Shrewsbury, which is still less likely. The Flora of Yorkshire gives a locality without any personal authority for it. In Babington's Manual the species is said to occur on "Alpine rocks in N. and S. Wales;" but I do not find any personal authority for South Wales. A Derbyshire locality, on indifferent authority, is recorded in the 'Botanist's Guide.' I have not seen this species lower than 550 yards, and therefore rely on Dr. Dickie, who says, "On the gravelly banks of the Dee, at Ballater, at 800 feet (42 miles inland)." It also occurs, according to the same writer, on the hill of Khoil, "at 1742 feet; this last is perhaps the true lower limit."

90. ARABIS STRICTA, *Huds.*

Area 1 * * * 5 * [7 * * * * * 12].
South limit in north of Somerset.
North limit in south of Gloucestershire.
Estimate of provinces 2. Estimate of counties 2.
Latitude 51—52. Local type of distribution.
Agrarian region. Inferagrarian zone?
Ascends to —— ?
Descends to —— ?
Range of mean annual temperature (49 or 48) ?

Native. Rupestral. Peculiar to some few spots in the neighbourhood of Bristol and Cheddar. As the line which divides the provinces of the Peninsula and Severn, or the counties of Somerset and Gloucester, happens to cross the small area within which this very local plant is circumscribed, it is accordingly indicated from two provinces, although distributed within a space altogether not equal to a county of average size. In North Wales, Arabis hirsuta was mistaken for this species; and the same mistake may likely have happened in the Lake province, where we have no good authority for the occurrence of A. stricta.

91. ARABIS CILIATA, *Br.*

Hibernian. Native in Ireland. Incognit in Scotland. The late George Don found an Arabis, which he calls "Turritis *nov. sp.*," near Lochlee, in Glen Esk, growing on rocks; and he states that Mr. J. T. Mackay recognized it as the same which he had found in Ireland, and which Dr. Smith had considered as T. alpina, of Linnæus. In the 'Flora Scotica,' the Glen Esk plant is referred to A. ciliata;

but it does not appear that the author had seen specimens from Mr. Don. The probability seems strong, that Arabis hirsuta, which occurs on the mountains of Forfarshire, was mistaken for the alpina or ciliata.

92. ARABIS HIRSUTA, *Br.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Devon, Isle of Wight, Kent.
North limit in Ross-shire and Isle of Skye.
Estimate of provinces 17. Estimate of counties 70.
Latitude 50—58. British type of distribution.
A. A. region. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1000 yards, in East Highlands.
Range of mean annual temperature 51—37.

Native. Rupestral. Not an abundant plant, though occurring in numerous localities. The actually reported counties, including my own manuscript localities, amount only to 45; so that I make a large advance to the estimate of 70. It is possible that 60 might be nearer the mark, but I cannot select 20 counties, from which this plant is very likely to be absent.

93. ARABIS TURRITA, *Linn.*

Area (* * 3 4 * * * * * * * * * * 15).

Alien. I have specimens from walls at Oxford (Sir W. C. Trevelyan), Cambridge (Rev. J. E. Leefe), and Cleish (Professor Arnott); and it is said also to occur in Kent. Allowed to be an introduced plant, and only of late admitted into our floras.

94. Turritis glabra, *Linn.*

Area * 2 3 4 5 * * 8 * 10 11 * 13 * [15 16].
South limit in Dorset, Hants, Kent.
North limit in Lanarkshire or Dumbartonshire.
Estimate of provinces 10. Estimate of counties 30.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends nearly to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—47.

Native. Rupestral, &c. On hedge-banks, old walls, in quarries, and by road-sides; not exactly according with any of my terms to express situation of growth. Neither is its distribution so uniform or regular as that of most other native species: whether we try it by places (localities) or by larger spaces (counties or provinces) we find it irregularly dotted over the country, with many and wide intervening blanks, as shown by the asterisks in the line of figures which indicate the area. The two most northerly localites of which I have any memoranda, are, Kinnaird, in Forfarshire, on the authority of the late George Don; and Bowling Bay, by the Clyde, on the authority of the 'Flora Glottiana.' The former of these localities seems to need confirmation; and as to the latter, I cannot say on which bank of the Clyde, north or south, Bowling Bay is situate. A specimen is in my herbarium, which came among a parcel of Lanarkshire plants, from Dr. Hooker; the specimens in the parcel, according to agreement, not being severally labelled.

95. BARBAREA VULGARIS, *Br.*
95, b. BARBAREA STRICTA, *Andrz.*
96. BARBAREA ARCUATA, *Reich.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray and Renfrewshire.
Estimate of provinces 16. Estimate of counties 70.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Viatical, &c. Grows by road-sides, on the banks of ditches and streams, in waste and cultivated ground, &c. On the whole, nearer to the definition of 'viatical,' than to that of any other of the terms used. Likely to be found in the West Highlands. Mr. Borrer finds B. stricta in Northamptonshire and Yorkshire, B. arcuata in Denbighshire and Northumberland. Judging by descriptions, I had thought that B. arcuata must have more the character of a species than B. stricta, inasmuch as its seeds are represented to differ in form, while those of the other two are described in almost the same terms. In a late No. of the 'Phytologist,' Mr. Borrer has expressed a different opinion, which I quote here: — "By the bridge over the Alne, going from Alnwick towards Embleton, I gathered what I take for B. arcuata. It seems to me far less satisfactorily distinct from B. vulgaris than B. stricta, which is so common about York, and in other parts of Yorkshire." (Phytol. ii. 433). Whether either or both are, or are not, distinct species from B. vulgaris, there can be no doubt

that the latter name has included the two dubious species, as far as British localities are concerned. And by reason of the impossibility of my distinguishing to which of the three the recorded localities of "B. vulgaris" do truly belong, I am compelled to treat their distribution in connexion. When possessed of sufficient data, I prefer to show the distribution of questionable species apart from the more typical forms, to which they would be assigned by the "lumper" in species-botany.

97. BARBAREA PRÆCOX, *Br.*

Area (1 2 3 4 5 * * * 9 10 11 * 13 14).

Alien. Having been long cultivated in gardens, this species occurs, from time to time, as a half-wild straggler, from the south coast of England, northwards to the Clyde and Forth, or even beyond those rivers. In few parishes has it acquired any real settlement. Dr. Bromfield says that it is abundant everywhere in the Isle of Wight. For several years it was always to be found on wastes about Thames Ditton; but the progress of enclosure and railway-making has since nearly extirpated it here; though it is still allowed to grow as a weed in one of my gardens, which was enclosed from the waste some few years back, and the weed then enclosed also — not sown or cultivated otherwise. This is the source of any specimens, labelled "Thames Ditton," which I have distributed with dates later than 1842.

98. NASTURTIUM OFFICINALE, *Br.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and Ross-shire.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Paludal. A very frequent plant in ditches and water-courses, until we approach the Highland provinces; and even in those provinces it would seem not to be rare in their low tracts bordering on the coast-line. I have ventured to include the North Isles within its area, as probable enough, though I can show no better authority than Lowe's list, for its occurrence northward of Ross-shire. The Rev. G. Gordon marks it "very common" in Moray.

99. NASTURTIUM TERRESTRE, *Br.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 16.
South limit in Devon, Isle of Wight, Sussex.
North limit in Aberdeenshire and Argyleshire.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Inundatal. Pretty frequent in England; but

decreasing in frequency northwards so decidedly as almost to justify its assignment to the English type, notwithstanding its occurrence in two of the Highland provinces. Rises very little above the midagrarian zone.

100. NASTURTIUM SYLVESTRE, *Br.*
100, b. NASTURTIUM ANCEPS, *Reich.*

Area 1 2 3 4 5 * 7 8 9 10 11 * 13 14 (15).
South limit in Devon and Sussex.
North limit in Edinburghshire and Dumfriesshire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England:
Range of mean annual temperature 51—47.

Native. Paludal. Less frequent than N. terrestre, though I have reason to think that the name of the latter is occasionally misapplied to examples of the present species; the one being thus made to appear more frequent, and the other less frequent, than the facts rightly warrant. Two localities in Fifeshire have been mentioned to me, or one locality under two names; "St. Davids" and "Inverkeithing;" but that county is so suspicious a locality, on its south coasts, I fear to receive it unless supported by the existence of a species in several spots, or in other neighbouring counties, northward of the Forth. In the 'New Guide,' the vicinity of Aberdeen was indicated for this species on the authority of a checked catalogue from Dr. Dickie. Some mistake is to be feared, the species being omitted from the 'Flora Abredonensis. Of N. anceps I know nothing. It is said to grow in the provinces of Ouse, Severn, Tyne and East Lowlands.

101. NASTURTIUM AMPHIBIUM, *Br.*

Area 1 2 3 4 5 * * 8 9 10 (11) * 13 14 [15].
South limit in Devon, Sussex, Kent.
North limit in Edinburgh and Lanark shires.
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Paludal. Not a common plant; although enumerated in seventeen of the twenty local Floras, used as the test of comparative frequency, by the compilers of the 'London Catalogue.' But as it appears not likely to be absent from the whole of Wales and the provinces of the Tyne and Lakes, I have ventured to add two of these four provinces to the number of ten apparently well ascertained. The Scottish localities rest on old or slight authority; but I let them pass muster on finding the species recognized as a native near Edinburgh, in the Catalogue published for the Botanical Society of that city. The province of Tyne (11) is enclosed because the place of its growth is given as on "ballast hills" only, and remains unconfirmed by recent observers. The name is marked in a list checked off for Alvah, in Banffshire; which, I fear, will prove an error.

102. SISYMBRIUM OFFICINALE, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Hebrides, Sutherland.

Estimate of provinces 18. Estimate of counties 81.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Viatical and Agrestal. Even this common weed has its limits with us, decidedly in altitude, and apparently in latitude. The name occurs in all the local floras, with the exception of that for Shetland. I find it noted in my list of plants seen about the towns of Dumbarton, Stirling, Perth and Inverness; as also in those for tracts on the east coasts of Ross-shire and Sutherland. But it is absent from the lists of species observed at Lochearnhead, Killin, Dalnacardoch, Glen Shee, Clova, Castletown, Dalwhinnie, Locheil and the north coast of Sutherland. Balfour and Babington admit it among the plants of the Hebrides, and it is enumerated in Dr. Gillie's manuscript Flora of Orkney, on faith of Lowe's list; possibly introduced to both these groups of Isles. In the county estimate, however, I venture to exclude only Shetland.

103. Sisymbrium Irio, *Linn.*

Area [1] * 3 4 [5 * * 8] * * * * * 14.
South limit near London and Oxford.
North limit at Berwick on Tweed.
Estimate of provinces 3. Estimate of counties 7.
Latitude 51—56. Local type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in Thames province.
Ascends very little above the coast level, say 50 yards?
Range of mean annual temperature 49—48.

Denizen. Viatical? It is rather puzzling to refer this plant to any type of distribution, to any category of citizenship, or even to any of the terms which express the kind of local situation. It still grows about London and Berwick-on-Tweed; and did grow about Oxford within twenty years ago, if not there now. In Buckinghamshire, Essex and Cambridgeshire, it was reported on good, though now ancient, authority. I suspect some inadvertence with reference to the county of Somerset; and those of Worcestershire and Derbyshire need to be confirmed on more trustworthy authority. Said to have covered the ground after the great fire of London.

104. SISYMBRIUM SOPHIA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 * 17.
South limit in Cornwall, Dorset, Kent.
North limit in Ross-shire and near Inverness.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Viatical. Thinly scattered through Britain; but I cannot select more than about a score of counties, in which the probability seems to be against its existence: these are chiefly on the western side of the island, where our botanical information is less full than for the eastern side.

SISYMBRIUM POLYCERATIUM, *Linn.*

Area (* * * 4).

Alien. I am unaware of any locality for this plant, except the vicinity of Bury, where it has apparently held its ground for many years. In Turner and Dillwyn's Guide the locality is given by Sir T. G. Cullum, "under garden walls in Northgate Street, Bury, and several lanes adjacent." In the 'New Guide' Dr. Bromfield says, "Still growing in the greatest abundance at the foot of walls, in Schoolhouse Lane, between Garland and Northgate Streets; also in the farther part of Garland Street, and thence spreading, with equal profusion, over the Short Bracklands, mixed with S. officinale and Coronopus Ruellii; and even creeping beyond the precincts of the town, towards Fornham, but very sparingly; but everywhere assuming the aspect of an indigenous weed." A writer ("J. D."—Mr. Denson, I presume) in the Magazine of Natural History, remarks, "I think that it emanated from the garden of the late Sir T. G. Cullum, Bart."

105. ERYSIMUM CHEIRANTHOIDES, *Linn.*

Area 1 2 3 4 (5 * 7 8 9 10 11 12 * 14 15 16).
South limit in Devon, (Dorset?), Kent.
North limit in Somerset, Cambridge, Norfolk.
Estimate of provinces 4. Estimate of counties 10.
Latitude 50—53. Germanic (?) type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in the Thames province.

Range of mean annual temperature 51—48.

Colonist. Agrestal or Viatical. Under suspicion of having been originally an alien, introduced by human agency; and though diffused over a great part of the island, as shown by the indicated provincial area, its localities are mostly suspicious or uncertain. It appears to be completely established in the provinces of Thames and Ouse; but those of the Peninsula and Channel are less satisfactory; and north and west from these four, the remaining provinces can be indicated for the plant only as an imperfectly established alien. I have occasionally seen it plentiful in ploughed fields, in Surrey; but more usually it is met with on wastes and by road-sides. While the South Western railway was in process of formation, across that county, this plant was abundant on and about the embankment, in many spots; thus making a chain or series of localities for several miles. Apparently the seeds remain buried many years without losing their capability of vegetating.

106. Erysimum virgatum, *Roth.*

Area (1).

Alien. "In the neighbourhood of Bath, the place of Erysimum cheiranthoides is supplied by this plant." — *C. C. Babington, in Phytol. Vol.* i. *page* 310. "Bath, quite as good a native as E. cheiranthoides."—*C. C. Babington, MS.* This is all the information which I have about the occurrence of this plant in England; but it seems not unlikely that other localities which have been assigned to the better known species, may really belong to this one: they are closely alike, though readily distinguishable while in fructification. As E. cheiranthoides only is mentioned in

Babington's 'Flora Bathoniensis,' I presume E. virgatum to have been really meant by that name. To which do other Somerset and Devon localities belong?

107. ERYSIMUM ALLIARIA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire and Dumbartonshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the south of England.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Septal. Common over a great part of Britain; yet decreasing much in the north and west of Scotland. Marked with the highest degree of frequency in the Edinburgh Catalogue, which my own mere recollection will scarcely agree with. About Glasgow said to be "not frequent;" and the same expression is applied to it in the Aberdeen Flora; while in the Moray Catalogue it is marked "rare." I have no memorandum of seeing it farther in the Highlands than the vicinities of Alva and Perth.

108. ERYSIMUM ORIENTALE, *Br.*

Area (1 2 3 4 * * * * * * 11).

Alien. Has appeared in some few places among corn, near the coast, and on ballast hills; but I know not that it retains its hold of the ground in any of the localities put on record. "It came up spontaneously in a field that had

been ploughed to form a garden, in the centre of the new square at Plymouth."—*Rev. J. S. Tozer, in British Flora.*

109. CHEIRANTHUS CHEIRI, *Linn.*

Area (1 2 3 4 5 * 7 8 * 10 11 12 13 14 15 16).

Alien. This familiar and favourite shrub of cottage gardens has been so long established in many localities, that it might merit the designation of 'denizen,' were not almost all its habitats on walls and buildings, particularly old castles and abbeys, about which it is likely to have been cultivated in days gone by.

110. MATTHIOLA INCANA, *Br.*

Area * 2.

South limit in the Isle of Wight.

North limit in the same Isle.

Estimate of provinces 1. Estimate of counties 1.

Latitude 50—51. Local type of distribution.

Agrarian region. Inferagrarian zone.

Descends to ——?

Ascends to ——?

Range of mean annual temperature 51.

Denizen. Littoral or Rupestral. Said to have formerly grown on rocky cliffs to the eastward of Hastings, where it is now extinct. Mr. Mill observed it in inaccessible places on Compton Cliffs, Freshwater Bay, Isle of Wight; and Mr. Gibson found it on cliffs at Steep Hill, a mile westward of Ventnor, to all appearance wild, in 1843. Dr. Bromfield favoured me with specimens from Compton Cliffs, and also with the following note: "Matthiola inca-

na grows on Compton Cliffs, under the wild, elevated tract of Afton Down, which is inhabited by sheep alone. It is very plentiful on the bare, perpendicular face of the chalk rock, forming bushes of two feet high, with thick, woody stems, sometimes as thick as the wrist, and lasting several years.". . . . ."Its other station is on a kind of soft, sandy rock, by the shore at Steep Hill, and some miles distant from the Freshwater locality. In both there is nothing to indicate a suspicion of the plant's having escaped from cultivation." With this information before me, I cannot continue to refer the Matthiola incana to the alien class, and yet confess some hesitation in admitting it to be a native of Britain; the denizen is a convenient neutral or intermediate category for plants thus in the balance.

111. MATTHIOLA SINUATA, *Br.*

Area 1 [2] * * * 6 7.
South limit in Cornwall and Devon.
North limit in Anglesea and Flintshire.
Estimate of provinces 3. Estimate of counties 10.
Latitude 50—54. Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, on the coast level, to North Wales.
Range of mean annual temperature 52—49.

Native. Littoral. Reported to occur on the coasts of Cornwall, Devon, Glamorgan, Pembroke, Merioneth, Caernarvon, Anglesea and Flint. The coast of Sussex has also been indicated, but possibly some mistake has occurred between this species and M. incana; the alleged localities for the two species, by different observers, being both near Hastings. I have ventured to add two to the ascertained

counties, on the probability that some of those between or adjacent to the eight counties named, may likewise produce it; for instance, Caermarthen or Cardigan.

MALCOMIA MARITIMA, *Br.*

Area (* * 3).

Alien. Gathered by Miss Harvey, "under the cliff about half-way between St. Margaret's and Dover, in various places, for a quarter of a mile, where the banks are grassy." — *Rev. W. T. Bree, in Mag. Nat. Hist. Vol.* 7, *page* 271.

112. HESPERIS MATRONALIS, *Linn.*

Area (1 2 3 4 5 6 * 8 * 10 11 12 13 14 15 16).

Alien. Though now superseded in many places by newer or more ornamental flowers, this was formerly a favourite plant of the cottage garden; and even still is pretty frequently cultivated. Stragglers hence occur in various counties; but I know not that the plant has anywhere become fairly established, so as to be ranked correctly with the denizens.

113. BRASSICA OLERACEA, *Linn.*

Area 1 2 3 (4 5) 6 7 (* * 10 11 12 * 14 15).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Caernarvonshire and —— ?
Estimate of provinces 5. Estimate of counties 10.
Latitude 50—54. Atlantic (?) type of distribution.

Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, at or near the coast level, to North Wales.
Range of mean annual temperature 52—49.

Denizen. Littoral. British botanists appear disposed to admit the common cabbage among our native plants, with little or no hesitation. It has certainly become well established in many places, and may be an aboriginal in some of them; but I fear that the majority of recorded habitats assume a suspicious appearance, either on the spot or in description. Inland localities, about old castles and towns, may surely be rejected, in the case of a plant so long and universally cultivated; for example, the rocks about Stirling Castle. Several of the coast localities also are on cliffs close by towns and castles; as those of Penzance and Scarborough. And though some few, more likely to be native habitats, may still remain, I cannot avoid regarding these with doubt. The marvel appears to myself to be, not that the cabbage should have become wild in a few out-of-the-way places; but that it should have become wild in so few of such places. It may be indigenous on the south and west coasts.

114. BRASSICA CAMPESTRIS, *Linn.*

Area 1 2 3 4 5 * 7 8 * 10 (11) 12 * 14 15 16.
South limit in Devon, Dorset, Kent.
North limit in Forfar, (Aberdeen?), Argyle shires.
Estimate of provinces 14. Estimate of counties 50.
Agrarian region. Inferagrarian—Superagrarian zones.
Latitude 50—57. British type of distribution.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Colonist. Agrestal. I feel myself utterly at a loss in what manner to indicate the distribution of this species and B. Napus; believing them to be frequently mistaken, one for the other, and confused also with stragglers of the cultivated turnep, B. rapa, in which the root has not enlarged. Probably I am myself no exception in this confusion of the three (if they be truly three) species. My herbarium includes few examples. Those collected by my own hand are from North Devon, Surrey and Middlesex, and perhaps Castletown, in Braemar. I am unable to distinguish these from a Forfarshire example, labelled "B. campestris," by the late Mr. R. Maughan, or from a leafless branch in fruit, labelled "B. campestris — Inch Garvie," by Mr. W. Brand. But as none of my specimens have root-leaves remaining, and they are otherwise in different stages of growth, no very exact comparison can be made among them. On mentioning my difficulty about the Brassicæ to Dr. Bromfield, he wrote, "I am as much at a loss as you are to distinguish these species, especially the two last;" namely, campestris and Napus. Mr. Babington unites Rapa and campestris; and while still keeping Napus apart as a species, he observes of it that "it is difficult to find any character by which to distinguish this plant from the preceding." In the Flora of Northumberland and Durham, Mr. Winch remarks of B. campestris, "this plant, so common by the Thames, does not appear to be truly a native of Northumberland or Durham." In general, our botanists admit it as an unquestioned native. If I am correct in referring to campestris the starvling examples seen near Castletown, in a barley-field, the range of temperature might be carried three or four degrees lower, for a habitat of 350 yards in elevation, far inland, about the line of 57°. But there can be little doubt that the seeds of those examples, or of their

progenitors had been carried thither. The essential point of this long story is, simply that I know very little about the species of Brassica, and their individual distribution; and that I suppose other British botanists not to be much more enlightened thereon.

114, b. Brassica Rapa, *Linn.*

Area (1 2 3 4 * * 7 8 * 10 11 12 13 14 15).

Alien. Though occasionally found in a wild state, I presume the true turnep to be derived from those now so much cultivated by farmers. Brassica Erucastrum, also, has occurred among clover in Surrey, but doubtless introduced.

115. Brassica Napus, *Linn.*

Area 1 2 3 4 5 6 * 8 * 10 11 12 13 14 15 * * 18.

South limit in Devon, Isle of Wight, Kent.

North limit in the Hebrides and Moray.

Estimate of provinces 18. Estimate of counties 70.

Latitude 50—59. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 51—46.

Colonist. Agrestal. Trusting to the reports and writings of other botanists, I set down this species as if distributed generally over Britain; the four provinces, for which I have no authority to adduce, being those in relation to which we possess only very incomplete published lists. I have never seen—at least never recognized—the species;

and it has never been sent to me under name of 'Napus,' except from the "Castle Rock," at Edinburgh. See the remarks under B. campestris.

116. SINAPIS ARVENSIS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 400 yards, in the East Highlands.
Range of mean annual temperature 52—43.

Native. Agrestal and Septal. Abundantly common as this plant is with us, and locating itself on hedge-banks as well as in cultivated ground, it is still, perhaps, originally an agricultural introduction. I observed it in the fields about Castletown and Dalwhinnie, 350 and 400 yards; but whatever we may say about the lower and southern distribution, the ascent to that elevation, in the Highlands, is natural only through the aid of man, who prepares the ground, and probably carries thither the seeds.

117. SINAPIS ALBA, *Linn.*

Area 1 2 3 4 5 * 7 8 * * 11 * 13 14 15 16 17 18.
South limit in Devon, Isle of Wight, Kent.
North limit in Hebrides and Ross-shire.
Estimate of provinces 18. Estimate of counties 60.
Latitude 50—59. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—46.

Colonist. Agrestal and Septal. Not a plant by any means generally common, although apparently scattered almost the whole length of Britain. It is sufficiently probable, however, that the four provincial vacancies will eventually be filled in; and it may be incorrect to bring down the county census below 70. Perfectly established, though not clearly a native; and, indeed, decidedly more like an immigrant than is S. arvensis; for there can be no doubt that many of its localities have originated from cultivation.

118. SINAPIS NIGRA, *Linn.*

Area 1 2 3 4 5 6 7 8 * * 11 * 13 14.
South limit in Cornwall, Isle of Wight, Kent.
North limit about Glasgow and the Firth of Forth.
Estimate of provinces 14. Estimate of counties 50.
Latitude 51—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Native. Viatical, &c. Occasionally by road-sides and on cliffs by the sea-coast, this species has much the appearance of being truly native; though a doubt may arise on the subject. As it grows, apparently native, on the isles of the Firth of Forth, something above the latitude of 56,° another degree might have been added to its range, and the East Highland province to its area of distribution;

but this would be more of a straining after exactness in physical space, than after essentialities in climate and geography. The estuary of the Forth is the broad line of separation between Lowland and Highland provinces; and its isles have a Lowland climate.

119. SINAPIS INCANA, *Linn.?*

Sarnian. Isles of Jersey and Alderney. "We learn from the Linnean Herbarium that the *S. incana*, Linn., is not our plant, but only a variety of *Brassica nigra*, Koch." — *Bab. Prim. Floræ Sarnicæ.*

120. SINAPIS TENUIFOLIA, *Br.*

Area 1 2 3 4 5 6 7 * 9 10 11 12 * 14 15.
South limit in Devon, Hants, Kent.
North limit in Fife and Cumberland.
Estimate of provinces 14. Estimate of counties 30.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Denizen. Viatical and Rupestral. By road-sides, and especially on old buildings. May be native in the south of England; but in its Scottish localities, it barely claims to be accounted a denizen. There is still much uncertainty about the published localities for this species and S. muralis; the one having been frequently mistaken for the other.

121. SINAPIS MURALIS, *Br.*

Area 1 2 3 4 5 6 * * [9] * (11 . . . 15).
South limit in Dorset, Sussex, Kent.
North limit near Bungay, Bristol, (Swansea?).
Estimate of provinces 6. Estimate of counties 12.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Channel.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—49.

Denizen. Viatical and Glareal. The present species is plentiful, and apparently indigenous, along both sides of the Thames, for several miles above London. Through the Botanical Society of London I have received specimens, collected in the vicinity of Bungay, by Mr. Stock, and near Bristol, by the Rev. T. Butler and others. For other localities in the southern provinces, I rely upon the eyes of other botanists. Hudson's "Brassica muralis" includes both this and S. tenuifolia; and his locality of "Chester walls" belongs to the latter only. Winch considers the "muralis" introduced to the ballast hills of Tyne; and the Fifeshire locality, from which I am favoured with specimens by Mr. Brand, is allowed by himself and other Edinburgh botanists, to have equally had its origin in ballast carried thither.

122. SINAPIS MONENSIS, *Bab.*

Area * * * * * 6 7 * 9 * * 12 13 * [15] 16.
South limit in Glamorganshire.
North limit in Skye or Bute.

Estimate of provinces 6. Estimate of counties 12.
Latitude 51—57. Atlantic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in South Wales.
Ascends, on the coast level, to West Highlands.
Range of mean annual temperature 50—48.

Native. Littoral. Inhabits sandy ground on the west coast, from Glamorgänshire (Mr. Moggridge, Bot. Soc. London, sp.) to Bute (Dr. Hooker, sp.) or Skye (Ray, Hudson). For the present, I have given its range of latitude and temperature only to Bute; to which a degree must be added for Skye, provided the plant really grows there. In English Flora, on the authority of Mr. G. Don, Smith reports this species from the East Highland province, "between Dundee and Forfar." This locality is in itself suspicious for a plant otherwise limited to the western coasts; I am unaware that Mr. Gardiner, or any other Scottish botanist, has confirmed its correctness; and though there is a specimen from Don, preserved in Smith's herbarium, that specimen appears to my eyes not a wild example of this species.

123. SINAPIS CHEIRANTHUS, *Koch.*

Area * * * * * [6].

Incognit, in England. Sarnian. Mr. C. C. Babington records this plant as a native of Jersey and Alderney. But probably the S. monensis was mistaken for it in Glamorganshire. I have a note from Mr. Churchill Babington, intimating that Mr. C. C. Babington had discovered the S. Cheiranthus on "Penard Sands;" and in the third volume of the Magazine of Natural History, New Series, Mr. T. B. Flower published the locality, on the apparently

joint authority of himself and Mr. C. C. Babington, supported by Mr. Woods: "This interesting plant was detected on the sands near Pennard Castle, in the summer of 1838, by Mr. Woods. It was still plentiful when I visited the spot in company with my friend, C. C. Babington, Esq., in August last." But a manuscript note from C. C. B., dated in 1843, assigns the locality of Pennard to S. monensis; and specimens sent to the Botanical Society of London by Mr. Moggridge, from "Three Cliffs Bay, Gower," are referrible to S. monensis. I presume, therefore, that Messrs. Woods, Babington and Flower at first mistook S. monensis for this species, but that afterwards Mr. C. C. Babington changed his opinion. Is this so?

124. RAPHANUS RAPHANISTRUM, *Linn.*

Area, general.
South limit in Devon, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 yards, in East Highlands.
Range of mean annual temperature 51—43.

Colonist. Agrestal. A common and generally distributed plant; and yet apparently dependant on agriculture for its permanence in this country, assuming the corn-field weed to be specifically distinct from the plant of the coast. On this account I class it among the colonists, rather than among the certainly aboriginal natives.

124, b. RAPHANUS MARITIMUS, *Sm.*

Area 1 2 * * * 6 7 * * * * * 13 * * 16 * [18].
South limit in Cornwall and Sussex.
North limit in Bute and Cantire.
Estimate of provinces 7. Estimate of counties 10.
Latitude 50—56. Atlantic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends, on the coast level, to the Peninsula.
Ascends, on the coast level, to the West Highlands.
Range of mean annual temperature 52—48.

Native. Littoral. Reported to grow in the counties of Sussex, Cornwall, Somerset, Pembroke, Merioneth, Wigton, Ayr, and the isle of Bute; also, according to the Shetland Flora, on the eastern shores of Bressa, which should be confirmed on more experienced authority than the late youthful author of that Flora. Specimens of R. Raphanistrum, brought from the Azores, induced me to suppose that even R. maritimus might come within the range of variation for that changeable species; but on raising a series of descendants, four successive years, from the Azoric stock, and finding them gradually becoming more and more like the R. Raphanistrum of our corn-fields, and therefore not approaching nearer to R. maritimus, I am thrown back upon the presumption of the distinctness of these species until I can get an opportunity of raising descendants of the coast plant in an inland garden.

125. RESEDA LUTEOLA, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 * 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire and about Glasgow.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Viatical. Though nearly general in its distribution, if estimated by large spaces, as provinces or counties, this is still not so frequent a plant, that its absence from any parish or similar extent of country, would seem remarkable. It decreases northward; but is said to be frequent about Glasgow; and in the Edinburgh Catalogue it is even marked with the highest degree of frequency, which is surely wrong. In the neighbourhood of Aberdeen it must be very rare, as it was unknown there so late as 1838, the date of the Flora Abredonensis, though discovered afterwards. In Moray it is considered as a species perhaps introduced, by the Rev. G. Gordon; who, however, marks it in his checked list of Ross-shire plants. In my own manuscript notes I find it entered as seen both in Moray and Ross, without any memorandum of doubt as to its nativity there; but I was only a passing tourist in that quarter.

126. RESEDA LUTEA, *Linn.*

Area 1 2 3 4 5 6 [7] 8 * 10 11 * * 14 15.
South limit in (Cornwall?) Isle of Wight, Kent.
North limit in Aberdeenshire and Forfarshire.
Estimate of provinces 12. Estimate of counties 30.
Latitude 50—58. Germanic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—47.

Native. Viatical, &c. Prevalent in the chalk tracts of the south-east of England; but extending also to the limestones of the more western and northern counties; and running so far up the east coast of Scotland, as to give somewhat of the English and British character to its geographic type. Two Cornish localities are mentioned in Jones's Tour. The species is omitted from the Flora Devoniensis; but Dr. Southby marks it in his checked list of Somerset plants, and it is reported from the vicinities of Bristol and Bath, on sufficient authority also. Mr. J. E. Bowman marked the name in a list of British plants, checked for Denbighshire; but as the name of R. Luteola was not marked, it seems likely that some inadvertence occurred: the latter species is the one included in Mr. Rowland's list of plants near Wrexham. If native "on the Inch," at Aberdeen, that would seem to be its extreme north limit, which is but slightly above the line of 57°. The Rev. G. Gordon deems the species certainly introduced into Moray.

127. RESEDA FRUTICULOSA, *Linn.*
127, b. RESEDA ALBA, *Linn.*

Area (1 2 * 4 5 6 * 8 9 * * 12 * 14).

Alien. Cultivated in gardens, under the name of "upright Reseda," and occasionally found by road sides and in corners where garden refuse is thrown out; particularly near the sea shore, where the winter cold is not severe enough to destroy the plants. It is not easy to distinguish R. fruticulosa from R. alba, and they are probably a single species only; sometimes the one name, sometimes the other, is connected with the localities; but I doubt whether the reporters usually know for certain which species or variety they really mean by the names. The number of petals is assuredly inconstant in R. fruticulosa and other species; for it varies in different flowers on the same single plant.

128. HELIANTHEMUM VULGARE, *Gaert.*
128, b. HELIANTHEMUM SURREIANUM, *Mill.*
128, c. HELIANTHEMUM TOMENTOSUM, *(Dun.?)*

Area 1 2 3 4 5 6 7 8 * 10 11 12 13 14 15 * 17.
South limit in Devon, Isle of Wight, Kent.
North limit in Ross-shire and Lanarkshire.
Estimate of provinces 16. Estimate of counties 70.
Latitude 50—58. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 600 or 650 yards, in East Highlands.
Range of mean annual temperature 51—41.

Native. Rupestral and Pascual. Distributed widely, yet very unequally. Apparently much influenced in its localities by the presence of chalk or harder limestones, and yet found on gravel in some spots where there can be little or no lime within reach of the plants. It occurs also in great local abundance upon various volcanic rocks. Though I have no reference among my notes, to any localities in the provinces of Mersey or West Highlands, the species seems so likely to occur in one or both of those provinces, that I have put down the estimate at 16, and might have said 17 even, instead of the ascertained number of 15. By general acquiescence, the H. tomentosum, of English Botany, and the H. surreianum are now referred to H. vulgare.

129. HELIANTHEMUM CANUM, *Dun.*

Area * * * * [5] 6 7 * * 10 * 12.
South limit in Glamorganshire.
North limit in Westmoreland and Yorkshire.
Estimate of provinces 4. Estimate of counties 8.
Latitude 51—55. Local type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends nearly to the coast level, in South Wales.
Ascends to 650 yards, in Yorkshire.
Range of mean annual temperature 50—42.

Native. Rupestral. On the limestone hills of Wales and the north of England; being an example of the Anglo-Cambrian group of species, mentioned under Draba muralis. Occurs in the counties of Glamorgan, Caernarvon, Anglesea, Denbigh, Flint, York, Westmoreland (and the northern extremity of Lancashire, taken with Westmoreland into the Lake province) and, perhaps, Cumberland. "Penpool Rocks," near Bristol, is a locality published by Mr. Thomas

Hancock, for "a single specimen" of the present species; but some error is to be feared. I presume that the highest locality is the "summit of Cronkley Fell," on the Yorkshire side of the Tees; the exact altitude of that locality being unknown to me: it is estimated at 2000 feet.

130. HELIANTHEMUM POLIFOLIUM, *Hook.*

Area 1 * * * [5].
South limit in Devon.
North limit in Somerset.
Estimate of provinces 1. Estimate of counties 2.
Latitude 50—52. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends nearly to the coast level in Devon.
Ascends to a trifling elevation only?
Range of mean annual temperature 51—50.

Native. Rupestral? Two localities only are on record for this rare species; namely, cliffs at Babbicombe and Torquay, on the south-east coast of Devon (Flora Devoniensis), and Brean—not, Brent—Down, on the coast of Somerset (Sir W. C. Trevelyan, sp.). I do not know the heights of these localities.

HELIANTHEMUM LEDIFOLIUM, *Willd.*

Area [1].

Incognit. Hudson records this from sandy pastures and meadows, near Brean Down, Somersetshire; but possibly some error had occurred between this and the preceding species. The Rev. J. C. Collins has sought the alleged locality, year after year, unsuccesfully.

† HELIANTHEMUM BREWERI, *Planch.*

Area * * * * * * 7.
South and north limit in Anglesea.
Estimate of provinces 1. Estimate of counties 1.
Latitude 53—54. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends to ——? Ascends to ——?
Range of mean annual temperature 49 or 48.

Native. Rupestral or Pascual? The name, rather than the species, is a recent addition to the British flora. The plant had been long known as an inhabitant of Holyhead mountain; but it had always been united with H. guttatum, until Dr. Planchon observed the rather wide dissimilarity between them, and described this present one under a new specific name, in the London Journal of Botany. So far as known, the H. Breweri is absolutely restricted to the Isle of Anglesea; though likely enough it will be found elsewhere. Not having seen the locality, I am unable to give correctly the altitude, &c. It is said to grow on "micaceous schist."

131. HELIANTHEMUM GUTTATUM, *Mill.*

Area [1 * * * 5 * 7].

Incognit in England. Hibernian and Sarnian. This has been reported to grow in Somerset (Robson—B. G.); and Mr. Thomas Hancock has stated that "a few specimens" were collected in an excursion from Bristol to Penpool and Blaize Castle; but whether this refers to Somerset or Gloucestershire I am unable to say. The North Wales

locality belongs to the now dissevered H. Breweri, and not to the true H. guttatum.

132. VIOLA PALUSTRIS *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in (Orkney?), Hebrides, Sutherland.
Estimate of provinces 18. Estimate of counties 70.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends nearly to the coast level, in the Peninsula?
Ascends to 1300 yards, in the West Highlands.
Range of mean annual temperature 50—34.

Native. Uliginal or Paludal. Plentiful on wet, swampy moors, and over the Highland mountains; but occurring only quite locally as we advance into the southern provinces. It is curious that so arctic a species should be omitted wholly from the Flora of Shetland. By name, this is the case also with the manuscript Flora of Orkney, now in my possession; but there can scarcely be a doubt that the "*V. odorata*, sweet violet.—On wet banks and uncultivated fields," of Lowe's list, really intends the V. palustris.

133. VIOLA ODORATA, *Linn.*
133, b. VIOLA IMBERBIS, *Leight.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * * [18].
South limit in Devon, Isle of Wight, Kent.
North limit in Forfarshire and about Glasgow.
Estimate of provinces 15. Estimate of counties 60.
Latitude 50—57. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 51—47.

Denizen. Septal and Sylvestral. This is usually treated as a true native; but, if I except the Isle of Wight, I have never seen an unsuspicious-looking locality for it. By far the greater number which have come under my own eyes were in the immediate vicinity of gardens or houses; several of them about old castles, abbeys, farm-houses, and such-like places. I have seen it occasionally remote from houses or gardens, near the sides of streams which overflow their banks. But in the coppices of the Isle of Wight, I must allow, it has very much the look of a true native. There is one such locality in Thames Ditton parish, Surrey, except that it is restricted to two yards of ground, which throws suspicion upon it. Mr. Newman has observed the white variety plentiful in old copses near Godalming. Though reported from Forfarshire, like almost everything else, by the late George Don, the V. odorata is wholly omitted from the Floras of Aberdeen and Moray; not appearing even as a naturalized or introduced species. Dr. Bromfield writes, in reference to the southern extremity of England, the Isle of Wight, "Not many species are more common than this in our woods, copses and banks. Some of our thickets are carpetted with it and V. hirta; but the flowers with us are usually white or lilac, rarely of the true violet colour." I know not that any English botanist has taken up the same idea, but it has been suggested by a good botanist of the continent, that V. odorata and hirta are truly a single species only. On the whole, perhaps, we may receive V. odorata as a native of some few of the most southern provinces, and as a tolerably well naturalized plant northward to the Clyde and

Forth. Classing it with the "denizens," I have taken both native and naturalized area and ranges together. It seems to myself that all degrees may be traced from V. odorata into V. imberbis; the latter being rather a variation than a variety.

134. VIOLA HIRTA, *Linn.*

Area 1 2 3 4 5 6 7 8 * 10 11 * 13 14 15.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Forfarshire and Dumfriesshire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Sylvestral, &c. Chiefly on chalk and limestone, and the various rocks which are currently designated "trap" or "basaltic;" and hence, though its area extends over two-thirds of Britain, it is still somewhat of a scarce plant on account of the wide spaces which intervene between its localities. The type of distribution is uncertain, though nearest the English. Did we look chiefly to the north of England and Scotland, its type would appear eastern or 'Germanic;' but its westerly extension into Cornwall, and into South and North Wales, throws it into the 'English' group. As far as my collection of localities can show, I find no authority for the Viola hirta in any western county, northward of Wales, except that of Chester, for which a single locality is on record, and that of Dumfries, in which Lightfoot records it to be frequent.

135. VIOLA CANINA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 900 or 950 yards, in East Highlands.
Range of mean annual temperature 52—38.

Native. Septal, Ericetal, &c. Plentifully distributed throughout Britain; growing both in shady groves and hedge-rows, and fully exposed to sun and wind on the open commons. Under different conditions of exposure and humidity, the V. canina varies greatly, in luxuriance of growth, and in the form and size of the leaves, which range from cordate-reniform to ovate-lanceolate, or even into narrowly lanceolate, if we unite the varieties grouped under V. flavicornis and lactea to the present species. On Carnedd David, in North Wales, I saw V. canina at nearly 1100 yards of elevation; but in respect of climate that altitude is scarce equal to 950 yards in the Highlands.

135,d. VIOLA FLAVICORNIS, *Smith.*
135,e. VIOLA LACTEA, *Smith.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 * 14.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Edinburghshire and Isle of Man.
Estimate of provinces 14. Estimate of counties 50.

Latitude 50—56. English (?) type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends nearly to the coast level, in England.

Ascends to 100 or 200 yards, (in Peebles?).

Range of mean annual temperature 51—46.

Native. Pascual, &c. It will be troublesome to determine the true distribution of either of the varieties or species, intended by the above two names. I believe them to be simply two varieties of a single species, passing so gradually one into the other, as to render any definite or permanent distinction quite impossible; and I am well assured, by examination of specimens and labels, that the two names are usually applied indeterminately and conjecturally. Were this the only difficulty, it might still be easy to ascertain the distribution of the two in connexion, although not that of either singly and apart from the other. Unfortunately, dwarf examples of V. canina, differing from the typical form in size alone, have been repeatedly mistaken for Smith's V. flavicornis; and Mr. Forster has done his best to perpetuate this error, by publishing some such dwarf examples of V. canina, under name of V. flavicornis, in the Supplement to English Botany, plate 2376. And apparently misled by that plate, Mr. Babington has extended the error, by referring to the plate as a figure of the true V. flavicornis of Smith, and likewise of his own variety "pusilla." He should have omitted the reference to "Sm.;" the plant of Smith being a different thing, and not agreeing with any of the varieties recorded in the Manual, though coming between "montana" and "Ruppii" of that work. It cannot be the "montana," as described; because Smith's plant has small flowers, when compared with V. canina, which differ also in tint and shape. Neither can it be "Ruppii," because the leaves of Smith's flavicornis are not "narrowed into the petiole." While

among the living plants, on the commons in Surrey, I have never experienced difficulty or doubt in distinguishing the true flavicornis (*Smith*) from the dwarf examples of canina (pusilla, *Bab.*). But I must acknowledge that I have collected specimens on the sandy coasts of England, and on sterile gravel, by Castletown, in Aberdeenshire, which I could not satisfactorily assign to either, in the absence of flowers; and that by cultivation in my garden, the real V. flavicornis, of Surrey, becomes so like these doubtful coast and Scottish plants, that, late in the summer, there is difficulty in saying in what respect it differs from some examples of V. canina. I am disposed, with Mr. Babington, to combine all into one species; but if there are two species, V. canina (including 'pusilla') must stand for one, and V. flavicornis (*Smith*,—not Eng. Bot., 2376) and V. lactea (*Smith*) go together for the other species. In this confusion and uncertainty the distribution of the second species (flavicornis and lactea) must be imperfectly understood. The specimens in my herbarium, which I refer to one or other of Smith's two species, here joined as one, are from Sussex, Kent, Surrey, Norfolk, Cambridge, Peebles and Edinburgh; those more doubtfully so referred, are from Devon, Somerset, Isle of Man, Forfar, Aberdeen, and also some of the counties from which other specimens are confidently so referred. I am indebted to Sir W. J. Hooker for a specimen with numerous long branches, lanceolate leaves, and rather small flowers, collected by Mr. Nicholson, in Boultham Lane, near Lincoln, and labelled "V. montana, *var.* stricta." This comes very near the "Fig. 12, V. stagnina flaccida elongata," of Kirschleger's 'Notice sur les Violettes de la Vallée du Rhin.' The figures of that valuable essay, which come nearest to Smith's V. flavicornis, are "Fig. 5, V. intermedia (sylvatico lucorum)" and "Fig. 9, V. Reichenbachii ericetorum fructifera." If

the Castletown examples are to be referred to V. flavicornis, the area and the ranges of latitude, altitude, &c., must be extended beyond those which I have at present ventured to set down.

136. VIOLA TRICOLOR, *Linn.*
136,b. VIOLA ARVENSIS, *Mur.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 yards, in the East Highlands.
Range of mean annual temperature 52—43.

Native. Agrestal. Dissimilar as the extreme forms of these (supposed two) species really appear, there are yet so many gradually connecting links, that I find myself quite unable to draw any line of distinction between them. And while V. tricolor thus passes into V. arvensis on the one side, it approximates so much towards V. lutea and Curtisii on the other side, that a distinction becomes scarcely more easy between them. I have specimens from Castleton, Derbyshire, and New Brighton, Cheshire, which bring tricolor and Curtisii into close connexion; and others from Breadalbane, which I know not whether to call tricolor or lutea.

137. VIOLA LUTEA, "*Huds.*"
137,b. VIOLA AMŒNA, "*Symes.*"

Area [1] * * * 5 6 7 8 9 10 11 12 13 14 15 16 17 18.
South limit in Monmouthshire and Nottinghamshire.
North limit in the Hebrides and Ross-shire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 51—59. Scottish type of distribution.
A. A. regions. Superagrarian—Midarctic zones.
Descends nearly to the coast level, in Scotland.
Ascends to 900 yards, in the East Highlands.
Range of mean annual temperature 47—38.

Native. Pascual. Frequent in the hilly provinces of the north and west, and spreading into the comparatively low and plain tracts of Scotland. It will probably be found that the purple variety, amœna, prevails towards the upper limits of the species, and the yellow variety at a low elevation; though I can say nothing very positive on this difference, except that all my own notes of stations, having an altitude of 2000 feet or upwards, are marked down expressly for the 'amœna;' while recollection intimates that the yellow-flowered variety is the more common at lower elevations. I use 'pascual' as the most applicable term; but in its local situations the species becomes also an 'ericetal' and 'uliginal.' That this is really an identical species with V. grandiflora and sudetica, as announced in the Companion to the Botanical Magazine (vol. 1, p. 158), seems no longer to admit of doubt, although the spur of the continental specimens is usually longer than that of our more boreal plant. Strangely enough, the Botanical Society of Edinburgh has distributed the continental V. grandiflora under the name of "Viola lactea, *Sm.*;" while the

largest-flowered specimen of the Scottish V. lutea, purple variety, which I have ever seen, came to me from the same Society, under name of "Curtisii," though located from "Glen Turrit," Perthshire. Doubtless, the botanists who manage that Society know better, and this odd crossing of names must have arisen from occasionally employing label-writers who were not sufficiently careful in taking down names.

137,c. VIOLA CURTISII, *Forst.*

Area 1 * * * * 6 7 * 9 * * * * * [15].
South limit in Cornwall or Devon.
North limit in Anglesea or Cheshire.
Estimate of provinces 4. Estimate of counties 6.
Latitude 50—54. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, on the coast level, to the Mersey?
Range of mean annual temperature 52—49.

Native. Littoral and Glareal. I treat the distribution of this peculiar plant distinctly, not so much from supposing it to be a permanent species, as from inability to form any satisfactory conclusion whether it is nearer to tricolor or to lutea. In the last edition of the British Flora it is slightly mentioned as a yellow variety of V. tricolor; while in the Manual of British Botany it is placed as a variety of V. lutea. As a geographical botanist, I should find convenience in sinking Curtisii under tricolor; the area and climatic range of the latter, V. tricolor, comprehending those of Curtisii, which is not the case with the area and range of V. lutea. But against convenience I am compelled to set up the obstacle of V. Curtisii appearing nearer to V. lutea in its technical characters, especially in

the stipules. On my cultivated plant of V. Curtisii the capsules are generally abortive, and I have not succeeded in propagating it by seed. The specimens of certain V. Curtisii which are in my herbarium, are all from the north coast of Devon, about Instow and Braunton; but I have ventured to extend the area, &c., by uniting therewith some other localities not so certainly referrible to V. Curtisii. The first of these is the Land's End, Cornwall; where the Rev. J. S. Tozer is said to have found "a small variety" of V. lutea. A second is Cromlyn Burrows, South Wales, where Mr. Dillwyn is reported to have found V. lutea. A third is that of the sand hills, at New Brighton, on the Cheshire coast, where a Viola occurs which appears just an intermediate form between V. tricolor and V. lutea; and which, as appears by a manuscript note of the locality, was referred to V. Curtisii by so trustworthy an observer as the Rev. A. Bloxam. Mr. Babington informed me that he had collected V. Curtisii on the sands by Llyn Coron, Anglesea. Giving the distribution by counties, therefore, I may say that V. Curtisii occurs certainly in Devon and Anglesea, probably in Cornwall and Glamorgan, and perhaps also in Cheshire. Considering how little known this plant yet is, we may expect to hear of it from more than five counties. The East Highland province [15] is added to the area as an error, on account of the Edinburgh Botanical Society putting "Curtisii" on the labels of V. lutea, *var.* amœna.

138. DROSERA ROTUNDIFOLIA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.

Estimate of provinces 18. Estimate of counties 80.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to about 700 yards, in East Highlands.
Range of mean annual temperature 52—40.

Native. Uliginal. Frequent in Scotland and the north of England, but comparatively scarce in the south-eastern provinces, where swamps and bogs are less numerous, and of smaller extent.

139. DROSERA LONGIFOLIA, *Linn.?*

Area 1 2 3 4 5 6 7 8 9 10 [11] 12 13 * * 16 [17 18].
South limit in Cornwall, Hants, Sussex.
North limit in Yorkshire and West Inverness-shire.
Estimate of provinces 13. Estimate of counties 40.
Latitude 50—58. English type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Uliginal. Much less frequent than D. rotundifolia in England; and very local in Scotland. Winch could not verify its occurrence in the province of Tyne, and suggested that D. anglica had been thus named. It seems probable that the "D. longifolia," reported from Shetland, Orkney and Sutherland, is also D. anglica. Professor Balfour mentions this as seen by himself in Islay, and Mr. Churchill Babington found it at Arisaig, on the west of Inverness-shire; so that it may pass muster for a native in the West Highlands. It is more of a western

than an eastern species; but not so strictly western as to be referred to the Atlantic type.

140. DROSERA ANGLICA, *Huds.*

Area [1 2] * 4 5 6 * * 9 10 11 12 13 14 15 16 17 18.
South limit in Glamorganshire and Bedfordshire.
North limit in Shetland (?), Orkney, Hebrides.
Estimate of provinces 14. Estimate of counties 40.
Latitude 50—61. Scottish type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends nearly to the coast level, in the Ouse.
Ascends to 550 or 600 yards, in East Highlands.
Range of mean annual temperature 48—41.

Native. Uliginal. It is not quite easy to distinguish between the localities assigned for this species and D. longifolia; the names having been often misapplied. In the Botanical Tour, by Jones, the locality of Marazion Marsh is givenfor the present species; but I found only D. longifolia there, which is not mentioned by the author of the Tour. Polwhele and Hudson, and recently Mr. G. S. Gibson, have indicated it from Devon; yet the authors of the Flora Devoniensis do not record it for that county. Pulteney and Hudson also say Dorset and Hants, and Dr. Salter marks it as being "very common" within eight miles of Poole; but I do not find any other recent authority in support of these statements, and fear that D. longifolia was mistaken for the present species. On the contrary, I suppose that the "D. longifolia," of Shetland, may be really the D. anglica.

141. POLYGALA VULGARIS, *Linn.*
141,b. POLYGALA OXYPTERA, *Rchb.*
141,c. POLYGALA AMARA, *Don.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Hebrides, Sutherland.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 900 yards, in East Highlands.
Range of mean annual temperature 51—38.

Native. Ericetal, &c. Throughout Britain, with an apparent exception of the Shetland Isles, which I have still ventured to take into the county estimate, and said 82 rather than 81. Is rarely seen above 750 yards. Dr. Dickie observed it at 2500 feet, in Aberdeenshire; and in one spot on the Clova mountains, I estimated the altitude at 2700 or 2800 feet. The P. amara (*Don*) is said to have been found in Wiltshire, Surrey and Kent. Of P. oxyptera, as an English plant, I know nothing.

142. FRANKENIA LÆVIS, *Linn.*

Area * 2 3 4 * * * * * * (11).
South limit in the Isle of Wight and Kent.
North limit in Norfolk and Cambridgeshire.
Estimate of provinces 3. Estimate of counties 7.
Latitude 50—53. Germanic type of distribution.
Agrarian region. Inferagrarian zone.

Descends to the coast level, in the Channel.

Ascends, on the coast level, to the Ouse.

Range of mean annual temperature 51—49.

Native. Littoral. Curiously confined to the south-eastern angle of England; being reported from the counties of Hants, Sussex, Kent, Essex, Suffolk, Norfolk, Cambridge and Durham. The locality in the county of Durham being only that of "ballast hills," and apparently not verified of late years, may be thrown out of the true area. I cannot say whether still found in Cambridgeshire; but the letter "c," affixed to the name in Henslow's Catalogue, implies that the plant was there at no very distant date. Why does this species not extend westward of Hampshire?

FRANKENIA PULVERULENTA, *Linn.*

Area * [2].

Incognit. It is difficult to say whether this belongs to the very small group of extinct species, or to the numerous assemblage of those the names of which have been improperly introduced into English lists, through mistakes as to the species observed. Ray omits it, but it was added to the third edition of Ray's Synopsis, by Dillenius, who says, "found on the coast of Sussex, and sent by Mr. Brower." To this authority Hudson added his own, by the words, "In littore Sussexiæ inter Bognor et Brighthelmstone inveni." Nobody has since found it, and we make certain that it would not have escaped Mr. Borrer's eyes, if still existent on the coast between Bognor and Brighton.

143. ELATINE HEXANDRA, *De C.*

Area 1 2 3 * 5 * 7 8 9 * * * * * * 15.
South limit in Cornwall and Sussex.
North limit in Kincardine and Perth shires.
Estimate of provinces 10. Estimate of counties 15.
Latitude 50—58. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—46.

Native. Lacustral. The gradual manner in which the area of this little plant has been extended, and its localities increased in number, yields a striking illustration of the close attention bestowed upon British botany during the present century. Even so late as the date of the English Flora, 1824, we find its author recording only two localities for this species, in Shropshire and Berkshire. My collection of localities now indicates its occurrence in Cornwall (Rev. W. S. Hore,) Sussex (Mr. Borrer), Surrey (Rev. W. H. Coleman), Berkshire (Mr. T. F. Forster), Warwickshire (Dr. Lloyd), Shropshire (Rev. A. Bloxam), Anglesea (Mr. C. C. Babington), Leicestershire (Mr. Churchill Babington), Cheshire (Dr. Wood), Perthshire (Mr. James Macnab), Kincardineshire (Dr. Dickie). It seems so probable that other stations will yet be discovered for this minute plant, that I have ventured to add to the number of counties and provinces, in the line of estimates; although I could scarce select the two provinces and four counties in which it is most likely to be discovered: South Wales and the Lakes seem very probable. In too many counties to be referred to the "local" type; yet known in too few to be strictly "British."

144. ELATINE HYDROPIPER, *Linn.*

Area * * 3 * * * 7.
South limit in Surrey.
North limit in Anglesea.
Estimate of provinces 2. Estimate of counties 2.
Latitude 51—54. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level (?), in Anglesea.
Ascends to (50 yards?) in Surrey.
Range of mean annual temperature 49—48.

Native. Lacustral. It may be conjectured that this species also will be discovered in other localities besides those of Farnham, Surrey, and Llyn Coron, Anglesea. Mr. J. D. Salmon has distributed most beautifully dried specimens of both species, from the Farnham locality, through the Botanical Society of London.

145. DIANTHUS PROLIFER, *Linn.*

Area * 2 3 4 [5].
South limit in Isle of Wight and Sussex.
North limit in Berkshire and Norfolk.
Estimate of provinces 3. Estimate of counties 4.
Latitude 50—53. Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Channel.
Ascends ——? (Say to 50 yards).
Range of mean annual temperature 51—48.

Native. Glareal. Apparently confined to very few spots in the south and east of England. Dr. Bromfield

has supplied my herbarium with specimens from the Isle of Wight; it is in that of the Botanical Society of London, communicated by Mr. Lewis, from the neighbourhood of Windsor; and a specimen is in Smith's herbarium, marked "wild out of St. Austin's Gates," Norwich, and apparently collected there by Mr. Pitchford, in 1797. To these three counties that of Sussex may be added, on good authority. I fear that the "meadows between Hampton Court and Teddington" may produce only D. deltoides; and the "marl-pit at Landridge Hill, near Hanley Castle," Worcestershire, is stated to be unproductive of the present species, though formerly reported for it.

146. DIANTHUS ARMERIA, *Linn.*

Area 1 2 3 4 5 6 7 * 9 10 11 * * * 15.
South limit in Devon, Isle of Wight, Kent.
North limit in Durham and Forfarshire.
Estimate of provinces 12. Estimate of counties 25.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Pascual and Viatical. A scarce plant, although its provincial area is pretty wide. Judging by the reports of its localities, the situations of growth are very variable. I have met with it sparingly on clayey pasture, and once in a clover field, also on clay. Dr. Bossey showed me a locality in Kent (where, at the time, we did not see any example, though he had previously found the plant), by a road-side, on sandy ground. Woods and hedge-banks are also named by some of its collectors. I

have referred it to the superagrarian zone, partly on account of its locality of "Carse," Angus-shire, which is barely within that zone; but chiefly on account of Mr. James Backhouse's remark in the Phytologist (alluding to "Shull," where Listera cordata and Vaccinium Vitis Idæa are stated to grow):—"Dianthus Armeria occasionally springs up here, where the ling has been fresh burned off." The existence of the Listera and Vaccinium seems to indicate the upper zone of the agrarian region.

DIANTHUS BARBATUS, *Linn.*

Area (* * * * * * * * * 10 * * 13 14).

Alien. Three localities are given for this species in Woodford's Catalogue of Edinburgh Plants. In a manuscript Flora of Renfrewshire, by Mr. Montgomery, it is mentioned as growing on the "old castle of Elliestoun, naturalized." The locality of a "marl bank, in Studley Woods," was introduced into the Botanist's Guide, on the authority of Mr. Brunton. It would, perhaps, be better assigned to the Incognito class, as a casual straggler only.

147. DIANTHUS PLUMARIUS, *Linn.*
148. DIANTHUS CARYOPHYLLUS, *Linn.*

Area (* * 3 4 5 6 7 8 * 10).

Aliens. These are united, not because there is any doubt about their specific distinctness, but because their localities have been much confused; and they are equally aliens in England. With the exception of some of the castle walls in Kent (as those of Rochester Castle), and

perhaps those of Norwich, the published localities may all belong to D. plumarius: most of them certainly do so.

149. DIANTHUS CÆSIUS, *Sm.*

Area 1 * * * * * * [8].
South and North limit in Somerset.
Estimate of provinces 1. Estimate of counties 1.
Latitude 51—52. Local type of distribution.
Agrarian region. Inferagrarian zone?
Descends to ——? Ascends to ——?
Range of mean annual temperature 49?

Native. Rupestral. Apparently restricted to the one locality of Cheddar Cliffs, in Somerset; and not having seen that station, I am unprepared to say anything about the altitude at which the plant grows. Among the many botanists who have visited the spot, not one of them would appear to have had any larger or superior idea than that of collecting a rare species. Such is human nature, however. A thousand will do over again, or say over again, that which has been done or said before; but scarcely one in a thousand will start a new idea. The botanical mind offers no exception in this respect. A thousand will go and collect over again a rare species discovered by a predecessor; but scarcely one in a thousand will inquire into or examine the conditions under which it exists.

150. DIANTHUS DELTOIDES, *Linn.*
150,b. DIANTHUS GLAUCUS, *Linn.*

Area 1 [2] 3 4 5 * 7 8 * 10 11 12 * 14 15 * * [18].
South limit in Devon, Surrey, (Kent?).

North limit in Moray and (Ross-shire?).
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 150 yards, in Scotland.
Range of mean annual temperature 51—46.

Native. Rupestral and Glareal. Sparsely distributed up the east side of Britain, and still less frequent in the westerly provinces; though plentiful in some of its localities. In the British Flora, it is stated to grow as far north as Ross-shire; but I am not aware of the personal authority upon which that statement is made. There appears nothing unlikely in the occurrence of this species in Kent, and the interrogative will be understood only as asking for better authority in confirmation. Dr. Neill says that D. deltoides grows in the "island of Vailey, observed by Mr. G. White;" yet it is omitted from the Flora of Shetland. D. glaucus has been found about Edinburgh (Mr. Edmondston), in Yorkshire (Mr. Biden), and, dubiously indigenous, in Surrey. The type is partially Germanic.

151. SAPONARIA OFFICINALIS, *Linn.*
151,b. SAPONARIA HYBRIDA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.
South limit in Cornwall, Hants, Kent.
North limit in Fife and Ayrshire.
Estimate of provinces 15. Estimate of counties 50.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 150 yards, in England.

Range of mean annual temperature 52—47.

Denizen. Littoral and Viatical. Has much the appearance of being native on the coasts of Cornwall and Devon, and possibly is so elsewhere on the English coast. The inland localities are more to be suspected, being usually near houses or villages, and the plants frequently double-flowered, as in gardens; moreover, it is a species remarkably tenacious of the ground, by its numerous subterranean suckers, creeping like those of couch-grass, and is thus likely to be carried away with other garden superfluities, and to root afresh wherever thrown. The late J. E. Bowman said that it is undoubtedly wild in many spots, by the margins of streams, near Wrexham, in North Wales. The Rev. G. Gordon esteems it merely introduced into Moray.

SAPONARIA VACCARIA, *Linn.*

Area (* * 3).

Alien. A casual straggler, introduced with clover seed, flax, or otherwise. It has occurred in Berkshire and Hertfordshire; and Mr. Brichan states (Phytol. i. 553.) that it was found by Mr. Wilson, in July, 1842, in a field of flax, in the parish of Alves, Moray.

152. CUCUBULUS BACCIFER, *Linn.*

Area (* * 3).

Alien. Originally introduced into British lists, through some mistake respecting an Anglesea plant. (See Linn. Corresp. ii. p. 171.) Recently, however, Mr. Luxford has discovered the real plant, and thus describes the station: "The locality in the Isle of Dogs is on the banks of the

ditch on the left hand of the road from Blackwall to the Ferry House; and there, if not truly wild, it is at least perfectly naturalized." (Phytol. i. p. 255.)

153. SILENE INFLATA, *Sm.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 [18].
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross and Argyle shires.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 250 yards, in East Highlands.
Range of mean annual temperature 52—44.

Native. Pascual, &c. Not decidedly a common plant; but just one of those whose absence from, or presence in, any small area of a few miles, would scarcely attract notice. My notes of it include forty-seven counties, and doubtless it grows in many others for which I have no lists, unless for a few of the rare species. In Barry's Orkney, it is mentioned as growing "in clefts of rocks," a station which will probably belong to S. maritima. S. inflata, however, seems likely to occur more north than Argyle and Ross.

153,c. SILENE MARITIMA, *With.*

Area 1 2 3 4 5 6 7 * 9 10 11 12 13 14 15 16 17 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 60.
Latitude 50—61. British type of distribution.

A. A. regions. Inferagrarian—Superarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 1000 yards, or upwards, in West Highlands.

Range of mean annual temperature 52—36.

Native. Littoral and Rupestral. This is one of our few examples of a maritime species reappearing also as an alpine or arctic species; like the better known example of Armeria maritima. But the present species, less rarely than the latter, also occurs in the intermediate mountain valleys at a moderate altitude. On the coast, some specimens of Silene maritima become so very like those of S. inflata, as to be hardly distinguishable, unless by their larger and more upright flowers; but the specimens from the arctic region are mostly very dwarf, with a prostrate habit and solitary flowers.

154. SILENE OTITES, *Sm.*

Area [* * 3] 4 [* 6 * * * 10].

South limit in Suffolk.

North limit in Norfolk.

Estimate of provinces 2. Estimate of counties 3.

Latitude 52—53. Germanic type of distribution.

Agrarian region. Inferagrarian zone.

Descends nearly to the coast level, in Ouse.

Ascends to (say, 50 yards), in same province.

Range of mean annual temperature 49 or 48.

Native. Glareal? An extremely local species, and perhaps better referred to the 'Local' than to the 'Germanic' type. The counties of Suffolk, Norfolk and Cambridge are those only in which the reported localities can be relied upon. The name occurs in the alphabetical list of species in Cooper's Flora Metropolitana; but in what page

of that work the locality is to be found, I cannot say; there being no scientific arrangement, and no index to the pages of the species, in the work mentioned. Aiken says that he found it on the "marshy banks of the Rhyddol, near Aberystwith," — doubtless only another example of his many and glaring blunders. The Yorkshire locality merits some farther search or research; Mr. Ibbotson reports it at "East moors, near Castle Howard, now probably extinct." (See Phytol. i. 577.)

155. SILENE ANGLICA, *Linn.*

Area 1 2 3 4 5 6 7. 8 9 10 (11) 12 13 14 15.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray and Ayrshire.
Estimate of provinces 14. Estimate of counties 40.
Latitude 50—58. English type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Agrestal and Glareal. Pretty frequent and apparently native in the south of England, where the soil is dry and sandy; as also in gravel pits. In the north of England and in Scotland, it is rather a colonist than a native, I fear. The figure (11) for the Tyne province is enclosed, because the only locality in Winch's Flora of that province, remains unconfirmed, and was on "ballast hills." The lake province is reckoned in the area solely on the alleged locality of the Isle of Man; this islet being taken along with the small province of the Lakes, to which it is nearest. Man and Ayr are the only two western counties in which I am aware of localities for Silene anglica north

of the Mersy; but how far this apparent scarcity may arise from our deficient information about the botany of the western counties, more extended observation will eventually determine.

SILENE QUINQUEVULNERA, *Linn.*

Area (* 2 3 4).

Alien. Reported to have been found in Sussex, Kent, Surrey, Berkshire, Suffolk and Bedfordshire. It is possible that some of these localities may belong to a spotted variety of our wild S. anglica; while others probably owe their origin to seeds of the plant cultivated in gardens as an ornamental annual. In the Flora of Tunbridge, Mr. Jenner writes:—"At the Moat, on the Forest, between Tunbridge Wells and Frant, in abundance in 1840, shewn to me by Mr. Maddock, who states he cannot account for its appearance, unless it was introduced with the manure carried up from the town. This was most probably the case at Wrotham and other places where it has been found." There appears no little probability, however, that S. anglica and S. quinquevulnera are both of them varieties of the Continental and Azoric Silene gallica. Except in the small flowers of the English plants, I can find no certain difference between them.

156. SILENE NUTANS, *Linn.*
"SILENE ITALICA."
"SILENE PATENS."

Area (1) 2 3 [4] 5 * 7 8 * 10 * * * (14) 15 * * [18].
South limit in Isle of Wight and Kent.

North limit in Kincardineshire and Flintshire.

Estimate of provinces 7. Estimate of counties 12.

Latitude 50—57. Local type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends nearly to the coast level in England.

Ascends to 50 or 100 yards, in England.

Range of mean annual temperature 51—48.

Native. Rupestral. The distribution of this species cannot be satisfactorily given; partly, because the name has been misapplied, and false localities consequently introduced into books; partly, because it is doubtful where the true species is wild, and where it exists only as an introduced plant. I have only one locality for the Peninsula; namely, at its northern extremity, on the authority of the Flora Bathoniensis, which questions the true nativity there. Again, somewhat unexpectedly, I find the name marked in a list of Isle of Wight plants, which Dr. Bromfield kindly checked for me, before leaving England; and that being my sole authority for the second province, I should have preferred to ascertain from Dr. B. (now abroad) whether the mark was intentionally or inadvertently affixed to the name of 'nutans:' perhaps it ought to stand so; for Dr. Bromfield rarely is inadvertent in his botanical doings. Next, we have the third province to consider; and here, on the cliffs of Kent, some species certainly does grow; and to which the various names of "nutans," "italica," "patens," and "paradoxa," have been applied, in a medley of confusion which I am not just now prepared to unravel. S. nutans is reported also from Hertfordshire, by Mess. Webb and Coleman, "probably introduced." For the province of Ouse, a locality has been published "in the corn, between Harrington and Wakerley," on authority of Morton's History of Northamptonshire; but this species is not a corn-field plant, and some other was more likely

the one seen there. Nobody appears to have confirmed the correctness of the Rev. W. Wood's locality of "Hawkestone," in Shropshire, which is the only one in the fifth province, as far as my notes go; but as the S. nutans grows in Dovedale, on the Derbyshire side of a narrow stream, it may also grow on the Staffordshire side of the same stream, which will give the species a "local habitation" just within the county limit of the Severn province; though, in respect of physical geography, that part of Staffordshire belongs of right to the Trent province. The provinces of North Wales and Trent are not disputed. That of Yorkshire requires corroboration; the single locality, "rocks about Knaresborough," resting on old and not very safe authority. "Salisbury Crags," by Edinburgh, is the locality given with specimens, which are labelled "S. italica," from the Edinburgh Botanical Society; but surely that species must have been sown there, or it would have been earlier discovered by some of the numerous good botanists, with which that city is always supplied. The counties of Fife, Forfar and Kincardine, have been several times reported on ample authority. S. nutans seems best to associate with the Anglo-Cambrian group of the Local type. Its headquarters are on the limestones of North Wales and Derbyshire, with several outposts or outlying localities, of which the south-east coast of the East Highlands appears to be the strongest. As to Orkney, it stands only on the faith of Lowe's list, and cannot be received without additional authority. The stations on the borders of the East Highlands, and perhaps those among the hills of Derbyshire, carry its range almost within the superagrarian zone. I have not so indicated the zonal range, because those northern localities seem quite restricted to the coast line, where the climate is hardly that of the upper zone.

157. SILENE NOCTIFLORA, *Linn.*

Area * 2 3 4 5 * * 8 * 10 11 * * 14 15.
South limit in Sussex, Berkshire, Worcestershire.
North limit in Forfarshire and Fifeshire.
Estimate of provinces 9. Estimate of counties 25.
Latitude 50—57. Germanic type of distribution.
Agrarian region. Inferagrarian—Superagrarian zone.
Descends nearly to the coast level, (in Channel?)
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—47.

Colonist. Agrestal. A scarce species, of questionable origin in Britain, though now well established. The Scottish localities are highly suspicious. The late George Don deemed that, in the "sandy corn fields, near the Havens or Hains, by the sea side," in Forfarshire, was "the only known habitat in Scotland, where it can be reckoned truly indigenous."

SILENE ARMERIA, *Linn.*

Area [* * 3 * * * * * 9 10].

Incognit. Frequently cultivated in gardens, as an ornamental annual; and absurdly introduced into the floras of Britain, because somebody once found it by the side of the Dee, near Chester; whither it had doubtless been conveyed, by the water or otherwise, from one of the many gardens which slope down to the edge of the stream, along the course of the Dee at Chester. Mr. Borrer observed it in a corn field at Weybridge. Mess. Webb and Coleman give it as a scarcely naturalised plant in Hertfordshire.

The Yorkshire Flora indicates it to have been found below Settle. As there appears to be no permanence in its localities, the term 'incognit' is applied, in preference to that of 'alien;' although it certainly has been found half-wild.

158. SILENE CONICA, *Linn.*

Area * * 3 4 [5] * * * * *(11) * * 14 15.
South limit in Kent.
North limit in Forfarshire.
Estimate of provinces 4. Estimate of counties 5.
Latitude 51—57. Germanic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zone.
Descends to the coast level, in Thames province.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—48.

Native. Glareal. Native, I presume, in the counties of Kent, Suffolk and Norfolk; and possibly so, in those of Haddington and Forfar. In Durham and Northumberland, it is reported only from the ballast hills. Said to have been once found "in a field at Iverly, near Stourbridge," by Mr. Scott, who appears to have been but a doubtful sort of authority for localities of plants. It is desirable that some accurate botanist would investigate the claim of this species to a Scottish nativity; as, if not really native there, its range of latitude must be contracted four degrees, and its zonal range kept to the lowest one only. The late Dr. Graham, too prone to use exaggerated terms, said that it was "profuse" on Dirleton Common, Haddingtonshire, in 1835; while Mr. Keddie reported it "in small quantity," in 1844.

SILENE ALPESTRIS, *Jacq.*

Area [15].

Incognit. "A specimen of this plant, gathered by the late Mr. G. Don, 'on a rock on a mountain to the east of Clova, Angus-shire,' is in Mr. Borrer's Herbarium." (*Bab. Man*).

159. SILENE ACAULIS, *Linn.*

Area [1] * * * * * 7 * * * * 12 * * 15 16 17 18.

South limit in Caernarvonshire.

North limit in Shetland, Orkney, Hebrides.

Estimate of provinces 6. Estimate of counties 15.

Latitude 53—61. Highland type of distribution.

Arctic region. Inferarctic—Superarctic zones.

Descends to the coast level, in Shetland.

Ascends to 1400 or 1450 yards, in East Highlands.

Range of mean annual temperature 44—32.

Native. Rupestral. Said to have been found on Dartmoor, in Devon, by a Mr. Gidley. Though difficult to conceive any other native plant mistaken for this one, unless it were Cherleria sedoides, while out of flower, and still less likely to be seen in the same county, we cannot receive the Silene acaulis as a native of a moor in Devonshire, far distant from any lofty hill, unless confirmed by some other authority. Among the high hills of North Wales and Scotland it descends to 500 or 400 yards; and in Shetland, it is said to be "found in crevices of rocks at the sea-shore, where it is constantly wet with the spray." In respect of absolute elevation and mean annual temper-

ature, therefore, this Silene would seem to descend within the agrarian region, in Shetland,—doubtless enabled to exist there in consequence of humidity and the low summer temperature. It will even live and grow tolerably well in the gardens of Surrey, exposed to the sun, if regularly watered in dry weather.

160. LYCHNIS ALPINA, *Linn.*

Area * * * * * * * * * * [12] * * 15.
South and North limits in Forfarshire.
Estimate of provinces 1. Estimate of counties 1.
Latitude 56—57. Highland type of distribution.
Arctic region. Midarctic zone.
Descends——?
Ascends——? (1000 yards ?)
Range of mean annual temperature, say 37.

Native. Rupestral. Discovered by the late G. Don, "on the summits of the Clova Mountains, in 1795;" and found by Dr. Graham and others, on the summit of a hill, called Little Kilrannoch, between Glen Prosen and Glen Callater. Dr. Graham estimated the hill at 3200 feet. It was pointed out to me by a shepherd, from the head of Canlochen Glen, and at that distance I thought it scarcely above 3000 feet. Stated in the Phytologist (ii. 185) by Mr. Richard Matthews, that a specimen of this species was found at an elevation of 2000 feet, in a narrow and deep ravine of Hobcartin Fell, a clay-slate mountain which rises from the vale of Lorton, Cumberland. This station will need to be confirmed.

161. LYCHNIS VISCARIA, *Linn.*

Area * * * * * * 7 * * * * * * 14 15.
South limit in Montgomeryshire and Roxburghshire.
North limit in Forfarshire and Perthshire.
Estimate of provinces 3. Estimate of counties 6.
Latitude 52—57. Local type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends to 100 or 150 yards, in Scotland.
Ascends to 300 yards (?), in North Wales.
Range of mean annual temperature 47—46.

Native. Rupestral. A very local plant, the distribution of which would seem to be determined more by the nature of the igneous rocks on which it grows, than by the climate. It is said to occur in the counties of Forfa, Perth, Fife, Edinburgh, Roxburgh, and also Montgomery; but very locally in each of them.

162. LYCHNIS FLOS-CUCULI, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Channel.
Ascends to 650 yards, in East Highlands.
Range of mean annual temperature 51—40.

Native. Paludal. Frequent as to localities, and general when tested by its area and estimated census; but being limited to damp or marshy ground, it will not rank among

the commonest species, like the Ranunculus acris or Bellis perennis. Probably of rare occurrence above the agrarian region.

163. LYCHNIS DIURNA, *Sibth.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 850 or 900 yards, in East Highlands.
Range of mean annual temperature 52—38.

Native. Septal and Rupestral. A familiar and abundant species in the hedge-rows of the chief part of Britain; but wholly wanting in the county of Cambridge, according to Relhan's Flora. Perhaps by some misprint, the L. diurna is marked for the Cambridgeshire plant, in Henslow's Catalogue. Very rare above the agrarian region; but I saw it luxuriant on the rocks of Canlochen Glen, flowering in July, and associated with Poa alpina, Cerastium alpinum, Erigeron alpinus and other alpine or arctic plants. Mr. Gardiner also records it, as seen by himself, on Stuich-an-Lochan, probably about the same altitude.

164. LYCHNIS VESPERTINA, *Sibth.*

Area 1 2 3 4 5 * * 8 9 10 11 * 13 14 15 * 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire and about Glasgow.

Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 300 or 350 yards, in East Highlands.
Range of mean annual temperature 52—43.

Native. Agrestal and Septal. The white and red flowered plants, associated together under the name of L. dioica, appear in several lists only under their Linnean name. For this reason, it is often uncertain whether only one or both are intended by the name 'dioica'; and in the absence of any explanation, I have assumed this latter name to mean only the red-flowered L. diurna. The white-flowered L. vespertina is probably most plentiful in the south and east of England; and it would appear to be pretty frequent in Scotland also, by the local floras and lists; though beyond the Grampians it may be only a 'colonist,' through agriculture.

165. Lychnis Githago, *Lam.*

Area, general?
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Ross-shire, Argyleshire.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Colonist. Agrestal. There is much probability that this species of Lychnis or Agrostemma is one of our introduced plants, which would again disappear from Britain, if

cultivation should be discontinued. It is, however, carried about the country, and sown with corn crops, year after year; and it may be held quite established as a weed in England; perhaps, also, in Scotland. It has occurred in Shetland, "in fields of wheat and rye, imported with the seed." Both Dr. Neill and Mr. Duguid report it from Orkney.

166. MOENCHIA ERECTA, *Sm.*

Area 1 2 3 4 5 6 7 8 9 10 11.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Durham and Cheshire.
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 400 yards, in North Wales (Bowman).
Range of mean annual temperature 52—45.

Native. Glareal. So small a plant is likely to be overlooked, and it seems probable that its northward termination is not so early or abrupt as present records would show. There is nothing in the nature of the soil or situation of its stations, which should prevent its growth in more northerly counties than those indicated for its limit; and the altitude at which it was found by Mr. Bowman, namely, on the top of Breiddon Hill, indicates a capability of bearing a colder coast climate than that of Cheshire. The presumption seems strong, that the Moenchia will yet be found in the Lake and West Lowland provinces, if not elsewhere in Scotland.

167. SAGINA PROCUMBENS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1250 yards, in East Highlands.
Range of mean annual temperature 52—35.

Native. Inundatal, Viatical, &c. One of the very few species whose distribution may be deemed universal in Britain; from the extreme south to the extreme north; from the coast to the alpine summits of all, unless two or three of the very highest, of our mountains. To a plant so universal in its distribution, none of our series of terms will apply singly; the two above used being, perhaps, the nearest or most comprehensive for its various situations.

168. SAGINA MARITIMA, *Don.*

Area 1 2 [3] 4 * 6 7 * 9 * 11 12 13 14 15 16 17 18.
South limit in Cornwall, Isle of Wight, Sussex.
North limit in Shetland, Sutherland, Hebrides.
Estimate of provinces 14. Estimate of counties 40.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends, at the coast level, to the North Isles.
Range of mean annual temperature 52—46.

Native. Littoral. Apparently to be found in almost every coast county from Sussex, round by the western coasts, to the Farn Islands, Northumberland. Between these extremes, on the eastern side of England, we have it recorded only from Suffolk, with any certainty. But the species is even yet only imperfectly understood by English botanists; and though, on the whole, our information about the botany of the eastern provinces is more complete than that of the western provinces, this difference scarcely holds with respect to the littoral plants of England; the shores of Lincolnshire and Yorkshire requiring much more examination than has hitherto been bestowed upon them. Included in Cooper's list of Metropolitan plants, but I do not know on what authority, nor where is the precise locality intended.

169. SAGINA APETALA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 * * [18].
South limit in Cornwall, Isle of Wight, Kent.
North limit in Forfarshire and about Glasgow.
Estimate of provinces 15. Estimate of counties 60.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Glareal, Viatical, &c. I suspect that the names of this one and the two preceding species are frequently inter-changed or misapplied by botanists; and if so, their distribution may be incorrectly given. Dr. Neill mentions this as a species observed by himself in Orkney; but as it is omitted from the floras of Moray and Aberdeen, and

from the lists of plants seen in the North and West Highlands, and North Isles, by various other observers, I am led to suppose that Dr. Neill mistook S. maritima for the present species. Don states that S. apetala occurs sparingly in Forfarshire, and I have a specimen from the vicinity of Perth. A rare plant within sixteen miles of Edinburgh, on the faith of the Botanical Society's Catalogue. According to Hopkirk, common about Glasgow.

170. SPERGULA SAGINOIDES, *Linn.*

Area * * * * [5] * * * * * * * [13] * 15 * 17 [18].
South limit in Perthshire and Forfarshire.
North limit in Sutherland.
Estimate of provinces 3. Estimate of counties 6 or 8.
Latitude 56—59. Highland type of distribution.
Arctic region. Inferarctic—Midarctic zones.
Descends to 650 yards, in East Highlands.
Ascends to 850 yards, in same province.
Range of mean annual temperature 40—38.

Native. Rupestral. In the few spots in which I have seen this species, it was growing in gravel by streams, or among wet rocks; so that it comes nearest to a rupestral, though somewhat of a paludal or uliginal also. Mr. Ainsworth reported that he found it on the Malvern Hills, in the Severn province, which is supposed to be erroneous. Dr. Philip Maclagan believes that he discovered it on the Carrick Hill, Ayrshire, along with S. subulata; but these two being with difficulty distinguished, that habitat must be deemed uncertain, for the present. Edmondston has a plant under name of Arenaria saginoides, in his Shetland Flora, which occurs in "dry gravelly places, frequent;" is it not the pentandrous form of Sagina procumbens? There

remain only the East and North Highland provinces, which can be relied upon; and within these two provinces it is reported to grow in the counties of Perth, Forfar, Aberdeen, Moray, and Sutherland. As I have collected the species within a few miles of the West Highland province, near the head of Moray, and there seems no cause wherefore it should not occur within that province, I have reckoned the West Highlands in the provincial estimate. It seems probable that the range of altitude, &c., equally as the area, is yet imperfectly ascertained; indeed, I have so much difficulty in distinguishing between this plant and S. subulata, that I am unable to use all my own notes on their localities; lest I should have confused them together in former years. They are probably one species only.

170,b. SPERGULA SUBULATA, *Linn.*

Area 1 2 3 * * * 7 * * 10 11 12 13 14 15 16 17 18.
South limit in Cornwall, Isle of Wight, Sussex.
North limit in Shetland, Sutherland, Hebrides.
Estimate of provinces 15. Estimate of counties 40.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 700 or 800 yards, in East Highlands.
Range of mean annual temperature 51—40.

Native. Glareal and Rupestral. As with the preceding species, the difficulty of satisfactorily distinguishing between them, throws much uncertainty on their distribution, apart from each other. While the range of the former was perhaps too much contracted, that of the present plant may be unduly extended, particularly in respect of altitude; but I feel compelled to carry this up to seven or eight hun-

dred yards, in consequence of receiving a specimen from Mr. Brand, labelled " subulata," which I cannot pass over to saginoides, and which my talented friend collected on the Clova mountains, near Loch Brandy. S. subulata appears very likely to occur in the provinces of Severn and South Wales. Its occurrence in the three most southerly provinces forbids the assignment of it to the boreal or Scottish type, which its area might otherwise seem to indicate.

171. SPERGULA NODOSA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and Hebrides.
Estimate of provinces 18. Estimate of counties 75.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 500 yards, in East Highlands.
Range of mean annual temperature 52—42.

Native. Inundatal, &c. Not a very common species, although its localities are quite beyond count, and its area includes almost the whole of Britain. This species, among several others so affected, appears to have its climatic range extended by the presence of limestone. It is rare in the Highland provinces. Only in one spot have I seen it at any considerable elevation; and there it was growing in and about a quarry of limestone, in Glen Beg, Perthshire, at 1530 feet of altitude, which brings it slightly within the boundaries of the Arctic region. Inhabits various situations, from marshes even to stone walls.

172. SPERGULA ARVENSIS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 or 450 yards, in East Highlands.
Range of mean annual temperature 52—42.

Native. Agrestal. Very abundant throughout the cultivated lands of Britain, and often seen profusely along the sides of newly formed roads, as well on those of the waste moors of Scotland, as on those in the richer lands of England; but the light, sandy or moory, soils appear best adapted for its production. Dr. Dickie has found it so high as 1386 feet, in Aberdeenshire, which exceeds the highest spot in which it has been observed myself; namely, in the neighbourhood of Castletown, in that county, at about 1100 feet.

Mr. Don mentions a "Spergula maxima—nova species," in "the low parts of the county" of Angus. Spergula pentandra, (Linn.) is "said to have been found in Ireland." (Bab. Man.)

173. HOLOSTEUM UMBELLATUM, *Linn.*

Area * * * 4.
South limit in Suffolk.
North limit in Norfolk.

Estimate of provinces 1. Estimate of counties 2.
Latitude 52—53. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends nearly to the coast level, in Ouse.
Ascends to 50 yards, or less, in same province.
Range of mean annual temperature 49 or 48.

Native. Rupestral or Glareal. An extremely local plant, which might be referred to the Germanic type, if its area were not so very restricted. Since it is said to grow "on walls and thatched roofs," I presume this one to come nearest to the 'glareal' category; though, for the most part, wall plants are rock plants.

174. ARENARIA TRINERVIS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire and about Glasgow.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferarian—Superagrian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—46.

Native. Sylvestral and Septal. Frequent, though scarcely a common plant, in England; in Scotland, it is less frequent. The Rev. G. Gordon marks it common in Moray. Has been found near Aberdeen, since publication of the Flora Abredonensis. Though "not common" about Glasgow (Hopkirk) I suppose it very likely to be not wholly absent from the West Highland province, which comes within some few miles of Glasgow.

175. ARENARIA PEPLOIDES, *Linn.*

Area, general?
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 50.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends, on the coast level, to the North Isles.
Range of mean annual temperature 52—46.
Native. Littoral. Apparently found all around Britain, on the sea shore, unless the province of Severn, with its limited coast line, shall prove an exception.

176. ARENARIA CILIATA, *Linn.*

Hibernian. One of the few mountain plants of middle Europe, which extend their area into Ireland, though absent from Britain.

177. ARENARIA NORVEGICA, *Gunn.*

Area * * * * * * * * * * * * * * * * * * 18.
South and North limit in Shetland.
Estimate of provinces 1. Estimate of counties 1.
Latitude 60—61. Local type of distribution.
Arctic region? Inferarctic zone?
Descends——? Ascends——? (50 or 100 yards.)
Range of mean annual temperature about 45 or 46.

Native. Rupestral or Glareal. Extremely local; having been found only in Shetland. Mr. Edmondston estimated that it grew at about 200 feet above the sea level; and from his remarks on this one, in connexion with other plants, I presume that it occurs above the limit of cultivation there. Its station is "on the loose barren gravel of a serpentine hill, immediately to the north and north-east of Baltasound, Unst." Its distinctness, as a species, appears questionable.

178. ARENARIA SERPYLLIFOLIA, *Linn*,

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Sutherland, Hebrides.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.
Native. Agrestal and Glareal. A common species; but more plentiful in the south than in the north. Absent from the Shetland Flora; and known as a native of Orkney, only on the faith of Lowe's list.

179. ARENARIA TENUIFOLIA, *Linn.*

Area 1 2 3 4 5 * [7 * * 10 * * * 14 15].
South limit in Devon (?), Sussex, Kent.
North limit in Norfolk and Warwickshire.
Estimate of provinces 6. Estimate of counties 15.
Latitude 50—53. English type of distribution.

Agrarian region. Inferagrarian zone.

Descends to the coast level, in the Peninsula.

Ascends to 50 or 100 yards, in England.

Range of mean annual temperature 51— 48.

Native. Glareal. Possibly I have here too much contracted the area and range of this species; but false localities for it appear so numerous, that I scarcely know which to trust, and which to reject. Several tolerable authorities (see Turner and Dillwyn's Guide) report localities in Yorkshire; and it is introduced into Baines's Flora of that county. The Flora, however, can be no additional authority. It would seem to have been merely made up with scissors in the library, by cutting out the localities from Teesdale's list and other sources, and cutting off the names of the botanical authorities. By this unworthy process, it is made to appear as if the writer of the Flora had actually verified the localities by his own personal observation; though I am satisfied that in many (probably, almost all) cases he has simply copied out the reported localities, and suppressed the names of their authorities.

†. ARENARIA ULIGINOSA, *Schl.*

Area * * * * * * * * * * 11.

South and North limits in Durham.

Estimate of provinces 1. Estimate of counties 1.

Latitude 54—55. Local type of distribution.

Arctic region? Inferactic zone.

Descends —— ? Ascends —— ? (About 600 yards.)

Range of mean annual temperature about 42.

Native. Rupestral? An extremely local species, and only recently discovered in Britain. As yet only a single locality is known; but there appears likelihood that it will

be discovered elsewhere in the northern provinces of England. Mr. G. S. Gibson, to whom I am indebted for a specimen, thus describes the locality:— "Near the top of Widdy-bank Fell, Teesdale, Durham, at an elevation of about 1800 feet." I cannot decide, by my specimen, whether to use the generic name of Arenaria or that of Spergula, both of which have been applied to this species, the Spergula stricta of Swartz.

180. ARENARIA VERNA, *Linn.*

Area 1 * * * 5 6 7 8 9 10 11 12 13 14 15.
South limit in Cornwall, (Somerset?), Derbyshire.
North limit in Aberdeenshire and Perthshire.
Estimate of provinces 12. Estimate of counties 25.
Latitude 50—58. Scottish type of distribution.
A. A. regions. Inferagrian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 850 yards, in East Highlands.
Range of mean annual temperature 52—38.

Native. Rupestral. Intermediate between the Scottish type of distribution and that which has been called the Anglo-Cambrian section of the Local type. Very rare in the Highlands, nor have I seen it there myself. Mr. W. Wilson reports it from Mael Duncrosk, Perthshire: "a very small distance from Craig Calliach; where, at nearly the same elevation, A. rubella occurs, and where A. verna is not found." It is on account of this station, that the altitude of 850 yards is assigned for the present species. Varies considerably, but not specifically, in the different localities indicated for it. Mr. Babington refers the Cornish locality to the variety "Gerardi."

181. ARENARIA RUBELLA, *Hook.*

Area * * * * * * * * * * * * * * 15 * 17.
South limit in Perthshire.
North limit in Sutherland.
Estimate of provinces 2. Estimate of counties 2.
Latitude 56—59. Highland type of distribution.
Arctic region. Midarctic—Superarctic zones.
Descends to 850 yards, in East Highlands.
Ascends to 1300 yards, in the same province.
Range of mean annual temperature 38—34.

Native. Rupestral. An extremely local plant, hitherto found only on the Breadalbane mountains, in Perthshire, and on Ben Hope, in Sutherland. The altitude of 1300 yards is given on faith of Mr. Brand, who found this species "near the top of Ben Lawers, above the station of Saxifraga cernua." It has been suggested that Arenaria rubella is an arctic variety of A. verna, and this view appears to be countenanced by a very good European botanist, Mr. Ball.

ARENARIA FASTIGIATA, *Sm.*

Area * [15].

Incognit. "On the rocks on the mountains of Angusshire and Fifeshire. *Mr. G. Don.*"

182. ARENARIA RUBRA, *Linn.*

Area, 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 [18].
South limit in Cornwall, Isle of Wight, Kent.

North limit in (Orkney ?), Ross, Dumbartonshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Glareal. Frequent in England, gradually become scarce in a northerly direction. Reported by Mr. Alexander Duguid to occur in Orkney, but I fear that A. marina was mistaken for the present species. The number of Floras for A. rubra is misprinted 13 (instead of 19) in the London Catalogue; thus making it appear much scarcer than is the fact.

183. ARENARIA MARINA, *Oed.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland and Orkney.
Estimate of provinces 18. Estimate of counties 50.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends, at the coast level, to Shetland.
Range of mean annual temperature 52—46.

Native. Littoral. All around the coasts of Britain, on sandy shores and rocks and even in wet clayey ground. Varying considerably, but the varieties do not appear to require any special enumeration here.

184. STELLARIA NEMORUM, *Linn.*

Area * * [3] * 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Glamorgan, Monmouth, Derby shires.
North limit in Moray and Dumbartonshire.
Estimate of provinces 12. Estimate of counties 30.
Latitude 51—58. Scottish type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends to a trifling elevation, in England.
Ascends to 150 yards or upwards, in Scotland.
Range of mean annual temperature 49—46.

Native. Sylvestral. In Cooper's list of Metropolitan Plants, but doubtless erroneously. The altitude, in the north of England, is probably twice that given above for the plant in Scotland; but on this point I have no exact information. Like several other species assigned to the Scottish type, the present prevails in the north of England and south of Scotland, without extending much into the Highlands, or into the extreme north of Scotland.

185. STELLARIA MEDIA, *With.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 850 yards, in the East Highlands.
Range of mean annual temperature 52—38.

Native. Agrestal, &c. Well known as one of our most universal weeds in gardens, fields, and road sides; becoming rare above the agrarian region, though still occasionally met with in spots trodden by cattle or sheep, up to 800 or 900 yards. It is conveyed to all parts of the globe, where agricultural processes are carried on, unless some of the hot and dry intertropical countries be exceptions.

186. STELLARIA HOLOSTEA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and Ross-shire.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 600 or 650 yards, in East Highlands.
Range of mean annual temperature 51—41.

Native. Septal and Rupestral. Very scarce above the agrarian region; but observed in Forfarshire and Aberdeenshire, between 500 and 700 yards. Probably rare in the North Isles; Dr. Neill being the only botanist who has recorded it thence. I call it 'Rupestral,' because it is seen hanging from the crevices of rocks, among the mountains, where hedges are non-existent.

187. STELLARIA GLAUCA, *With.*

Area 1 2 3 4 5 * * 8 * 10 11 * 13 14.
South limit in Dorset, Sussex, Kent.
North limit about Edinburgh and Glasgow.

Estimate of provinces 12. Estimate of counties 40.
Latitude 50—56. English (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends nearly to the coast level, in the Channel.
Ascends to 50 or 100 yards, about Edinburgh.
Range of mean annual temperature 51—47.

Native. Paludal. Far from a common plant within the area indicated for it; but as it is a species likely to be overlooked, I have ventured to estimate the census higher than the recorded localities warrant, by two provinces and eight or ten counties. Stated to occur in Cornwall; but not being included in the Flora Devoniensis, and no recent observer having confirmed the Cornish locality of "Falmouth" it seems better to give the south-western limit in Dorset, for the present, on the authority of Dr. Salter's List of Poole plants.

188. STELLARIA GRAMINEA, *Linn.*
188,b. STELLARIA BABINGTONII, *Deak.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Sutherland.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Supcragrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 400 or 450 yards, in East Highlands.
Range of mean annual temperature 52—42.

Native. Pratal and Septal. A very common plant throughout the low grounds of Britain, and running up the mountain valleys as far as cultivation extends. I am quite

unacquainted with S. Babingtonii, except by the notice of it in the 'Manual of British Botany.'

STELLARIA SCAPIGERA, *Willd.*

Area * [15 16].

Incognit. "By the sides of rivulets on the Scottish mountains. In Perthshire, and Loch Nevis, Inverness-shire.—*Mr. G. Don.*" (English Flora).

189. STELLARIA ULIGINOSA, *Murr.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1050 or 1100 yards, in East Highlands.
Range of mean annual temperature 52—36.

Native. Paludal and Uliginal. Almost universal in Britain, about ditches and streamlets; even flowering in the rills of water, with a summer temperature of 38 or 39, at 1000 yards of elevation on the Grampians. It is curious that Linnæus should have considered this as a variety of S. graminea. When growing on dry ground, as it may occasionally be seen upon banks of earth thrown up in clearing out water-courses, this species forms a sort of tuft, with very numerous branches; and it then assumes very much the semblance of a Paronychia.

190. STELLARIA CERASTOIDES, *Linn.*

Area * * * * * * * * * * * * * * * 15 16.
South limit in Perthshire and W. Inverness-shire.
North limit in Aberdeenshire and Moray.
Estimate of provinces 2. Estimate of counties 4.
Latitude 56—58. Highland type of distribution.
Arctic region. Superarctic zone.
Descends to 900 yards, on Ben Nevis.
Ascends to 1300 yards, on same group.
Range of mean annual temperature 36—34.

Native. Rupestral. Grows in wet gravelly spots on a few of the loftiest mountains of the Highlands, on both sides of the fifty-seventh parallel; namely, on Ben Lawers, Ben Nevis and its neighbour the Red Cairn, Cairngorum and others adjacent thereto. In one spot only am I aware of its growing so low as 900 yards; namely, under the dark rocks on the north side of Ben Lawers, from which the snow-water trickles down to the spot occupied by this Stellaria, and doubtless gives its station there a lower summer temperature than the altitude might otherwise imply.

191. CERASTIUM AQUATICUM, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 (11) * [13 * 15 * * 18].
South limit in Devon, Isle of Wight, Kent.
North limit in Yorkshire and Cheshire.
Estimate of provinces 10. Estimate of counties 40.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 yards, in England.

Range of mean annual temperature 51—47.

Native. Paludal. Not common in England, but reported from upwards of thirty counties. In the province of Tyne, it has occurred on ballast hills. Hopkirk includes it in his list of Glasgow plants; Don says that it is found "near Dundee, but rare." Lowe enters it among his plants of Orkney. I fear to trust these localities without corroboration; and thus greatly limit the alleged area of the species, for the present. Possibly forty counties may be an extreme estimate; yet thirty would seem under the probability.

192. CERASTIUM VULGATUM, *Linn.*

Area, general.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Shetland, Orkney, Hebrides.

Estimate of provinces 18. Estimate of counties 82.

Latitude 50—61. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 350 yards, in East Highlands.

Range of mean annual temperature 52—43.

Native. Agrestal, &c. A common plant, the name of which has been inextricably crossed and confused with that of C. viscosum, in books. On account of this confusion of the two names, several modern botanists have used those of C. glomeratum (C. vulgatum) and C. triviale (C. viscosum) instead of the older Linnean names. An objection against this sort of change, occurs in the fact that scores or hundreds of other pairs of resembling species are

in a similar predicament of having their names crossed and misapplied by various authors; and if names are to be changed because authors have misapplied them, where are we to stop?

193. CERASTIUM VISCOSUM, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1100 or 1200 yards, in West Highlands.
Range of mean annual temperature 52—35.
Native. Pratal, &c. A most abundant and universally distributed species; being still frequent at 800 to 1000 yards on the Highland mountains. Grows on the top of Ben Aulder, near Loch Ericht, which appears to be considerably above 3000, and perhaps above 3500 feet in altitude. Occurs also at about 1100 yards, on the Breadalbane and Nevis mountains.

194. CERASTIUM SEMIDECANDRUM, *Linn.*
194,b. CERASTIUM PUMILUM, *Curt.*
194,c. CERASTIUM PEDUNCULATUM, *Bab.*
194,d. CERASTIUM ATROVIRENS, *Bab.*
194,e. CERASTIUM TETRANDRUM, *Curt.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 * 18.
South limit in Cornwall, Isle of Wight, Kent.

North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 and 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Glareal. Whether we have one, or more than one, species included under the above names, I feel myself quite unable to decide. But whatever may be the final decision on that point, it is now utterly impossible to show the distribution of the several forms, intended by those names, apart from each other. Various botanists have divided them into two species, in accordance with the quaternary or quinary division of the flowers; while Mr. Babington, discarding that test, divides them by the more or less membranaceous character of the bracts and sepals, with some other petty distinctions. Thus each one of Mr. Babington's two species, includes portions of two different species, as understood by Smith or Curtis; so that it becomes impossible to pair the synonymes, except by fragments of species. Besides this difficulty in the way of ascertaining the distribution of the supposed species, severally, we have to filch out some of the individual specimens of semidecandrum and tetrandrum, or of semidecandrum and atrovirens, to make up two other imaginary species, the C. pumilum (Curtis) and C. pedunculatum (Babington). But Mr. Babington has himself now given up his C. pedunculatum, both as a species and as a variety; making it "small by degrees," till finally—nothing. In the 'Magazine of Zoology and Botany,' it is figured and described at length as a true species. Four years later, he sinks it into a variety of atrovirens, in the 'Edinburgh Catalogue.' And two years later, again, it is unnoticed in the 'Manual,' al-

though a work in which varieties are more numerously and minutely recorded than in any preceding work on British plants. Strange, certainly, that a plant which was put forth as a true species in 1837, should not be worth mentioning as a variety in 1843! The creation and gradual extinction of this species may be thus chronologized:—

In 1837,— a species.
In 1841,— a variety.
In 1843,— a nothing.

Doubtless all botanists are at liberty to change their views with growing experience and increased observation. But I draw attention to this remarkable example of changed views, for two purposes: first, to show how impossible it must now be for me to trace the distribution separately, of the species or varieties here grouped together, while there is so little of certainty about them; and secondly, as a warning to others, against that hasty species-making, which distinguished Mr. Babington's earlier botanical career, but the injudiciousness of which, I suspect, that he now knows and feels. I say "feels"; because it has assuredly prejudiced, in the eyes of other botanists, one who is a most excellent observer of plants; and has made them receive with too much suspicion every other novel species to which his name is attached.

195. CERASTIUM ARVENSE, *Linn.*
CERASTIUM STRICTUM, *Linn?*

Area * 2 3 4 5 * 7 8 * 10 11 12 13 14 15 * * [18].
South limit in Hants, Sussex, Kent.
North limit in Moray, Dumfries, Man.
Estimate of provinces 12. Estimate of counties 30.
Latitude 50—58. Germanic (?) type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level in England.
Ascends to 100 yards, in Scotland.
Range of mean annual temperature 50—46.

Native. Glareal. In numerous localities, yet not at all a common species. Its distributive type is intermediate between three; namely, the Germanic, English, and British. Its western localities of Denbighshire, Isle of Man, and Dumfries, seem to remove it from the Germanic type; while its far northern stations, in Elgin and Nairn, are equally against its assignment to the English type. Intermediate between the English and British types, by its range of latitude, I have considered that its decided prevalence in the eastern, as compared with the western provinces, may bring it still nearer to the Germanic type, It is enumerated among the Orkney plants, by Barry or Lowe. A remarkable variety, probably the C. strictum, has been discovered in Ireland, by Mr. Andrews.

196. CERASTIUM ALPINUM, *Linn.*

Area * * * * * * 7 [8] * * * 12 * * 15 16 17 ?
South limit in Caernarvonshire.
North limit in Sutherland, (or Orkney ?)
Estimate of provinces 5. Estimate of counties 12.
Latitude 53—59. Highland type of distribution.
Arctic region. Midarctic—Superarctic zones.
Descends to 850 yards, or lower, in East Highlands.
Ascends to 1300 yards, and upwards, in same province.
Range of mean annual temperature 38—34.

Native. Rupestral. On Snowdon, in Caernarvonshire; on Helvellyn, in Cumberland; and in most of the Highland counties. If the C. tomentosum, of Barry's Orkney, is

really the present species, and not C. latifolium, the descending range of altitude may be brought down to 500 yards, or little more. I presume also that the locality of the Khoil, near Ballater, Aberdeenshire, on which C. latifolium has been stated to grow, must belong to the present species, which also gives it an altitude below 600 yards; and in doing so, may be considered to elevate its range of temperature up to 40 or 41. Attains the summit of Ben Lawers, which exceeds 1300 yards. The summit of the Khoil may be within the Inferarctic zone. The county of Lincoln, on the authority of Martyn, must be erroneous.

197. CERASTIUM LATIFOLIUM, *Linn.*

Area * * * * * * 7 * * * * * * * 15 16 17 [18].
South limit in Caernarvonshire.
North limit in Sutherland.
Estimate of provinces 4. Estimate of counties 8.
Latitude 53—59. Highland type of distribution.
Arctic region. Superarctic zone.
Descends to 1000 yards, in West Highlands.
Ascends to 1200 or 1250 yards, in the same province.
Range of mean annual temperature 37—34.

Native. Rupestral. On wet rocks and stony places upon the loftiest hills of the Highlands, and on Snowdon, in Wales. The frequent confusion of this and C. alpinum throws much uncertainty upon the alleged localities of the present, far less frequent, species. It certainly occurs in Caernarvonshire, Perthshire, Inverness-shire, on the confines of Moray and Aberdeenshire, and in Sutherland. It is reported also from Stirling, Argyle, Forfar, Orkney, and Shetland. I suspect that the species of Orkney is C. alpi-

num; and that of Shetland is treated below under name of C. nigrescens.

197,b. CERASTIUM NIGRESCENS, *Edmonst.*

Area * * * * * * * * * * * * * * * * * * 18.
South and North limit in Shetland.
Estimate of provinces 1. Estimate of counties 1.
Latitude 60—61. Local type of distribution.
Arctic region. Inferarctic zone.
Descends to 100 or 50 yards in Shetland.
Ascends to ————?
Range of mean annual temperature, say 46.

Native. Rupestral or Glareal. "Abundant on loose serpentine gravel, near Baltasound, Unst, growing with Arenaria norvegica and Aralis petræa." . . . . "I should imagine that they descend to within 200 feet of the level of the sea." (Flora of Shetland). This agrees with C. latifolium in flower, fruit, and seed; but differs much in foliage; and the differences remain quite as strong in the plants raised from seeds near London. I therefore describe its distribution apart from that of C. latifolium, though still inclining to hold it a variety of the Linnean species. See the subject discussed in 'Phytologist,' vol i. pp. 497, 586, 677, 717; but Mr. Edmondston's figures (497) are inexact, and worse than useless.

BUFONIA TENUIFOLIA, *Linn.*

Area * * [3 * * * * 8].
Incognit. Said to have been formerly found on Houns-

low Heath, and about Boston in Lincolnshire. It was unsuccessfully sought in the latter place, by Sir Joseph Banks, who thought that Bupleurum tenuissimum had been mistaken for it. Perhaps the Moenchia erecta was thus mistaken on Hounslow Heath.

198. CHERLERIA SEDOIDES, *Linn.*

Area * * * * * * * * * * * * * * * 15 16 17 18.
South limit in Stirlingshire and Perthshire.
North limit in Shetland and Sutherland.
Estimate of provinces 4. Estimate of counties 8.
Latitude 56—61. Highland type of distribution.
Arctic region. Midarctic—Superarctic zones.
Descends to 850 yards, in East Highlands.
Ascends to 1300 yards, in same province.
Range of mean annual temperature 38—34.

Native. Rupestral. A very alpine and local plant, though certainly found in the north of Sutherland at a lower elevation than here indicated; and unless there is some error in respect of its occurrence in Shetland, it must be found very much lower on Haroldswick and Ronas hills, in those islands. On the faith of its existence in Shetland, the range of temperature might be extended to 40 degrees, or higher. Though I should not have anticipated the occurrence of this plant in Shetland, it seems not sufficiently unlikely, to warrant the rejection of Mr. Edmondston's authority for it—somewhat hasty, as I know him to have been, in his nomenclature of plants.

199. LINUM USITATISSIMUM, *Linn.*

Area (general).

Alien. Having been much cultivated in Britain, and more generally so in former days than at the present time, the 'Flax' has been often found as a straggler, and unwisely recorded as if a British species. In addition to cultivation, there is another source from which it is propagated around London; namely, by bird-catchers, who carry the seeds of the flax and canary-grass to feed their call-birds, or for some other purpose, snd scatter them on commons, by way-sides, &c.; where they vegetate, but keep no permanent hold of the ground, so as to form good habitats, even as naturalizations.

200. LINUM PERENNE, *Linn.*

Area 1 * [3] 4 [5] * * 8 * 10 11 12.

South limit in Somerset and Suffolk.

North limit in Durham and Westmoreland.

Estimate of provinces 5. Estimate of counties 8.

Latitude 51—55. Germanic (?) type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends nearly or quite to the coast level.

Ascends to 100 yards, or probably upwards.

Range of mean annual temperature 50—47.

Native. Pascual? The distribution of this species connot be satisfactorily given; L. angustifolium, and even L. usitatissimum, having been mistaken for it in some instances. The authorities for its occurrence in the provinces of Thames (Martyn) and Severn (Lees, &c.) are

scarcely sufficient for reliance while unsupported by the production of specimens. I am almost afraid that the provinces of the Peninsula and Lakes may turn out to be errors also; but they are retained for the present. I feel equally unprepared to fix the altitude of the stations, and their character, whether pascual, glareal, or otherwise.

201. LINUM ANGUSTIFOLIUM, *Huds.*

Area 1 2 3 [4] * 6 7 [8] 9 [10] * 12.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Lancashire and the Isle of Man.
Estimate of provinces 7. Estimate of counties 15.
Latitude 50—55. Atlantic (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in the province of Thames.
Range of mean aunual temperature 52—48.

Native. Pascual and Glareal. Could we satisfactorily assign to their proper species the localities recorded for this and L. perenne, it seems highly probable, that the two species would be found correctly referred to the Germanic and Atlantic types; but in trusting to published localities, each one appears to intrude, here and there, by isolated habitats, within the area of the other of them. If it be correct that L. angustifolium occurs in Suffolk, Norfolk and Yorkshire, its distributive type will come nearer to the 'English,' than to the 'Atlantic.'

202. LINUM CATHARTICUM, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 800 yards, in East Highlands.
Range of mean annual temperature 52—37.

Native. Pascual. A common species on heaths and dry pasture ground; and seen pretty frequently up to 500 or 600 yards on the Highland hills, though rarely above 700.

203. RADIOLA MILLEGRANA, *Sm.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16 17 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and Sutherland
Estimate of provinces 18. Estimate of counties 60.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 yards, in England.
Range of mean annual temperature 52—46

Native. Ericetal. On sandy heaths, where the ground is damp, the Radiola occurs so frequently as to prevent our calling it a scarce plant; and yet it is too local in its habitats, to be classed among the common species. Though I possess no note of any locality in South Wales, probability

seems in favour of its occurrence there, and the provinces are accordingly estimated at the full number.

204. MALVA MOSCHATA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Argyle and Perth (or Moray ?)
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Septal. More frequent than abundant; its localities being numerous, yet the specimens usually few in each locality. The Rev. G. Gordon considers it doubtful as a native of Moray, and Dr. Dickie pronounces it introduced to the neighbourhood of Aberdeen. I therefore indicate its range and area as limited to the south side of the Grampians.

205. MALVA SYLVESTRIS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross and Dumbartonshire.
Estimate of provinces 17. Estimate of counties 70.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 52—47.

Native. Viatical. Doubtful whether this is truly indigenous northward of the Grampians, but I venture to describe it so up to the Murray firth, as there appear several localities in the East Highland province; and it is stated to be rather common in Moray. Abundant in the south of England, but decreasing so much in a northerly direction, that it might be almost as correctly referred to the 'English,' as to the 'British' type of distribution. Although M. moschata is indicated only in the two lower zones, and this one is carried up to the third, their range of temperature is almost unavoidably set down the same. The occurrence of the former about Perth implies a mean temperature below 48; and yet the extension of the latter to Kessoch, on the Murray firth, will scarce justify a temperature so low as 46.

206. MALVA ROTUNDIFOLIA, *Linn*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Moray and Aberdeen.

Estimate of provinces 15. Estimate of counties 60.

Latitude 50—58. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 yards in England.

Range of mean annual temperature 52—47.

Native. Viatical. Much less plentiful than M. sylvestris. Equally with the other two, Mr. Gordon considers this to be only a doubtful native of Moray. And as with those, the type of distribution is intermediate between English and British.

MALVA BOREALIS, *Wall.*

Area * * [3].

Incognit. Said to have been found at Hythe, in Kent, which requires confirmation. Whether this is truly the species intended by Ray (and by Hudson under name of M. parviflora) may be still uncertain. It has also been reported to me, from Glamorganshire.

MALVA ALCEA, *Linn.*

Area * [5 * * 8].

Incognit. Borders of fields, &c. (Ray. Syn.) In the counties of Warwick, Leicester and Nottingham (Huds. Ang.).

208. ALTHÆA OFFICINALIS, *Linn.*

Area 1 2 3 4 5 6 * 8 * [10 * 12 13 * 15] 16.

South limit in Devon, Isle of Wight, Kent.

North limit in Lincolnshire and Arran.

Estimate of provinces 8. Estimate of counties 15.

Latitude 50—56. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to a trifling elevation, in England.

Range of mean annual temperature 51—48.

Native. Paludal. A local species, which apparently has been reported from too many of the provinces. Mr. Denny is the authority for its occurrence in the province

of Humber, or Yorkshire. Winch quotes Hutchinson, with suspicion of a garden origin, for it in the Lake province. Dr. Burgess was told that it grew wild on the shore of the Solway Firth. In the Flora Glottiana, it is stated to occur on the Campsie Hills. Professor Balfour found it in Arran, between Brodrick and Kildonan Castle — a station which carries its range, on the west side of Britain, several degrees further north than would otherwise be admitted; but if wild in Arran, it may be so on the Solway likewise.

209. ALTHÆA HIRSUTA, *Linn.*

Area * * (3).

Alien. Apparently well established in its one locality, though we can scarce admit it to be anything more than an alien. The directions to find this plant and Salvia pratensis, are thus given by Mr. Dennes:—"Enter Cobham park by the gate nearest to Cobham; — proceed past the mausoleum to the large Spanish chestnut tree, which marks the junction of the three parishes of Cobham, Cuxton and Strood; — follow this road to the border of the wood, and incline to the right along the upper end of the field to which it leads; — and in a spot directly north of Cuxton Church these plants will be found."

210. LAVATERA ARBOREA, *Linn.*

Area 1 2 [3 4] * 6 7 * * * (11) 12 13 (14).
South limit in Cornwall, Dorset, Hants.
North limit on Ailsa Craig and in the Isle of Man.
Estimate of provinces 6. Estimate of counties 12.
Latitude 50—56. Atlantic type of distribution.

Agrarian region. Inferagrarian—Midagrarian zone.

Descends to the coast level, in the Peninsula.

Ascends, on the coast level, to West Lowlands.

Range of mean annual temperature 52—48.

Native. Littoral. On rocks of the coast, but very local. Has been recorded from Essex and Norfolk; but the Lavatera Olbia was the species mistaken for it in the former, and in the latter it cannot be found. In the province of Tyne, it has occurred only on ballast hills, and the ruins of the Castle on the Bass rock, Haddingtonshire, are too suspicious for the native locality of a plant otherwise confined to the western coasts; but it has long existed on the Bass; being recorded by Sibbald on that and other isles of the Forth.

LAVATERA OLBIA, *Linn.*

Area * * [3].

Alien or Incognit. "A few years since a new piece of road was made through Epping Forest to Woodford. At a spot called Fair-mead Bottom a large quantity of earth was dug from the forest and thrown up to raise the road, for the distance of about half a mile. The following summer the sides of this piece of road were covered with various plants, such as Senecio jacobæa, thistles, &c., and among them a great number of plants of Lavatera Olbia, a species not known, I believe, as a native of Britain. There is not the slightest doubt that the seeds had been buried for a vast number of years, and vegetated when brought to the surface, as it seems impossible for the plants to have got there in any other way. For three or four years they seemed to flourish, and flowered abundantly; but now the banks having become covered with grass &c., they seem to

be disappearing, and last year I could find only three or four plants. When I first noticed it there were hundreds scattered along the whole length of the raised portion of the road." (Henry Doubleday, in the Phytologist, vol. i. page 265. — 1842.)

211. TILIA PARVIFOLIA, *Ehrh.*

Area 1 2 3 4 5 6 (7) 8 * * (11) 12.
South limit in Devon and Sussex.
North limit in Cumberland and ——?
Estimate of provinces 8. Estimate of counties 15.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 yards, in the Lake province.
Range of mean annual temperature 51—47.

Denizen. Sylvestral. With this, as with some other apparently indigenous trees, doubts will arise whether they should be regarded as true natives, or as species originally introduced from the European continent. On the whole, the presumption seems in favour of this species being a genuine Briton. If so, we must explain its present scarcity, on the supposition that human operations have tended more towards extinguishing, than towards encouraging and diffusing the species in England: a supposition which is countenanced by the fact of some of its recorded localities producing only single or few aged trees, and these existing in spots where they were not likely to have been planted for any purpose of use or ornament. We have now so very few really natural woods left in England, that the existence of "entire woods of this species at Buckland, near Ashburton," seems an insufficient reason, by itself, for holding

the species native: what proof have we that "entire woods of this species" were not formerly planted? However, I am myself disposed to consider it native in the western counties, from Devon to Cumberland; and possibly it may be (or formerly have been) the same in several of the eastern counties also. I may refer to the New Guide for some details respecting its localities.

212. TILIA EUROPÆA, *Linn.*?

Area (1 2 3 4 5 * 7 8 * 10 11 * 13 14 15 16).

Alien? If this species is native in any part of Britain, it will probably be found so only in the southern and western provinces; and there is, as Dr. Bromfield well observes, no geographical improbability to oppose against the views of those botanists who consider it native. It is to be recollected, however, that most of the published localities are of suspicious credit; the name 'europæa' having been frequently applied to either of the other two species, or to all three promiscuously. On this unsettled question, about the nativity of our Tilias, two papers in the first volume of the Phytologist may be usefully consulted; one by the Rev. W. A. Leighton, page 147; the other by Dr. Bromfield, page 169. The arguments of these gentlemen go far towards showing that Tilia europæa and grandifolia might correctly be held "denizens," although here still kept among our "alien" species. But in reference to the papers on this subject, I would suggest that botanists should examine specimens before trusting to recorded localities. Mr. Lees is appealed to as an authority, in the paper of Dr. Bromfield; but having seen specimens sent to the Botanical Society of London, by Mr. Lees, I know that this latter gentleman was then la-

belling his specimens incorrectly. Was not the T. parvifolia the species intended by Linnæus under the name of "europæa"?

213. TILIA GRANDIFOLIA, *Ehrh.*

Area (* 2 3 4 5 * 7 8 * 10 11 * * 14 15).

Alien? Several botanists have supposed this species to be truly native in the provinces of the Channel, Thames, Severn and Humber; while in the other provinces its nativity is more frequently denied than affirmed. See the remarks on the two preceding species.

214. HYPERICUM ANDROSÆMUM, *Linn.*

Area 1 2 3 4 5 6 7 (8) 9 10 11 12 13 14 * 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in the west of Ross-shire and Durham.
Estimate of provinces 15. Estimate of counties 50.
Latitude 50—58. Atlantic type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—46.

Native. Sylvestral. A widely distributed example of the Atlantic type; extending almost to the whole length of our island, on the west side, and running through the southern counties, eastward into Kent and Essex. It occurs also in Norfolk, Northampton, York and Durham; but in Berwickshire is stated to be "too obviously the outcast of gardens." Whether wild anywhere in the province of Trent, I am not prepared to say; the locality of

"Nottingham Castle" is too suspicious to allow of that province (8) standing unenclosed in the line which shows the area of the species. As the plant grows in Staffordshire, Cheshire and Yorkshire, it may be expected also in Derbyshire, which is the most likely one of the Trent counties, wherein to find it.

215. HYPERICUM PERFORATUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 * 17 18.
South limit in Cornwall, Isle of Wight, Kent..
North limit in Shetland, Orkney, Ross-shire.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Septal. Although I find no recorded locality for this frequent species within the provinces of the Lakes or West Lowlands, its existence there seems so very probable that the estimate has been made to include both of those provinces. It is doubtless a scarce species in the North Highlands and Isles; the name not occurring in my own lists of plants observed in the counties of Ross, Sutherland and Caithness, nor in Balfour and Babington's list of species seen by themselves in the Hebrides. Edmondston gives two localities in Shetland; the name is quoted in Gillies's manuscript Flora of Orkney, but only on authority of Lowe's list; and by the Rev. G. Gordon, the species was observed at Rosehaugh, in Ross.

216. HYPERICUM DUBIUM, *Leers.*
216,b. HYPERICUM MACULATUM, *Crantz.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 * 15 16.
South limit in Cornwall, Hants, Sussex.
North limit in Fifeshire and the Isle of Arran.
Estimate of provinces 15. Estimate of counties 50.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 300 yards in province of Tyne.
Range of mean annual temperature 51—45.

Native. Septal. Finding it quite impossible for me to distinguish the localities recorded for these two alleged species, severally from each other, I am compelled to treat them as one. Nor, indeed, can I distinguish the two as species, in a satisfactory manner. It appears to me that almost all the specimens which I have received under either of these names (including with them the Arran specimens, said to be true H. dubium) belong to the species figured under the name of "dubium" in English Botany, plate 296. Among the exceptions, are two or three examples of H. perforatum, as I should have labelled them; as also two other rather puzzling specimens, with a calyx of an intermediate character, but, on the whole, appearing more near to H. perforatum than to H. dubium. One of these two was received from the Botanical Society of Edinburgh, and is labelled as H. maculatum, from Raith woods, Fifeshire, communicated by Mr. W. W. Evans. The other was obtained from the Botanical Society of London, and is located from Coniston, in the Lake province, communicated by Miss Beevor; this specimen having broader

sepals than usually seen in H. perforatum, though less broad and obtuse than those of dubium. Specimens collected in Devon and Hampshire are undistinguishable by any character of the calyx, from those collected in Arran. The question of species seems to resolve itself into this:—Is H. maculatum a distinct species in nature, or only a book species, made up by combining those examples of dubium and perforatum which approximate in the abnormal character of their calyx? And if H. maculatum be thus only a book species, are those intermediate forms, so named, sufficient evidence to prove H. dubium and H. perforatum varieties of one varying species? I am myself inclined, though not confidently so, to answer the former question in the affirmative, and the latter in the negative.

219. HYPERICUM QUADRANGULUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Sussex.
North limit in Ross-shire, Aberdeenshire, Argyleshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Inundatal. Like all the other species of its genus, in Britain, this one decreases in frequency northwards; but it is too generally diffused to allow of its geographic type being restricted to the English. Having seen this species near Callander, close upon the Highland borders, I carry down its range of temperature to 46. If growing also inland within the county of Ross, this would

afford an additional reason; but the plants of that county, on the authority of Mr. Gordon, were probably observed near the eastern coast line, the temperature of which is assumed to be 47 in the estimates for this work. But while the mean annual temperature may possibly be higher on the east coast of Ross, that of summer is probably higher at Callander.

218. HYPERICUM HUMIFUSUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray and extreme north of Argyle.
Estimate of provinces 16. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 150 yards, in the East Highlands.
Range of mean annual temperature 52—46.

Native. Pascual. Frequent in England, particularly in the southern counties; less so in Scotland, but said to be common even so far north as in Moray. On this account I venture to include the North Highland province in the estimated census, on the probability that a species which is common in Moray, will occur also in the east of Ross-shire.

219. HYPERICUM LINEARIFOLIUM, *Vahl.*

Area 1.
South and North limits in Cornwall and Devon.
Estimate of provinces 1. Estimate of counties 2.

Latitude 50—51. Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends ——? (At or near the coast level).
Ascends ——?
Range of mean annual temperature 52 — ?

Native. Rupestral. This species is stated to have been found at Cape Cornwall, by Messrs. Borrer and Babington; as also, "among granite rocks near the banks of the Teign, Devon," by a dissenting minister, the Rev. Mr. Hincks. The mention of "granite rocks" seems to refer the locality to the upper part of the stream, on or near Dartmoor; in which case the range of altitude and temperature must be carried farther than I have ventured to assign for the localities of the plant. Is there any certainty that the Devonshire specimens belong to this species?

220. HYPERICUM PULCHRUM, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 750 yards, in the East Highlands.
Range of mean annual temperature 52—40.

Native. Ericetal. Few English botanists appear to know that this is the most widely distributed species of its genus, in Britain. The name frequently occurs in local lists of "rare plants," in which other less general species are not mentioned. The elegance of the plant may render it more a favourite with botanical observers; and they may

be misled, in some degree, by a peculiarity in its distribution; namely, that its localities seldom extend over much space singly, and the specimens themselves are often thinly scattered in its localities. Still, it is so generally spread through Britain, that I cannot name any county from which it is more probably absent than present. Tried by counties, its census must be general or universal.

221. HYPERICUM HIRSUTUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15.
South limit in Devon, Isle of Wight, Kent.
North limit in Aberdeen and Moray.
Estimate of provinces 15. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel province.
Ascends to 150 yards, in the East Highlands.
Range of mean annual temperature 51—46.

Native. Sylvestral. Probability appears so far in favour of this species being found in the provinces of the Lakes and West Highlands, that I have added one province in the estimated census, and might, perhaps, have carried the estimate up to 16. Enters within the Highland valleys; having been observed at Aberfeldie, by Miss Twining; at Finlarig, by Mr. W. Wilson; and also near Killin, by myself. Should the range of temperature be brought down to 45?

222. HYPERICUM MONTANUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 [13].
South limit in Devon, Isle of Wight, Kent.
North limit in Durham, Cumberland, (Ayrshire?).
Estimate of provinces 12. Estimate of counties 30.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—47.

Native. Sylvestral. Some uncertainty remains as to the true north limits of this species in the western provinces. In the Magazine of Zoology and Botany, it is recorded from the "banks of the Doon, near Casilis," on the authority of Mr. James Smith; but as no other botanist appears to have recorded a Scottish locality, I feel some hesitation in carrying the area and range of the present species so far north. Two localities in Cumberland are given on the authority of Hutchinson, not confirmed by other observers, as far as my notes go. But from Westmoreland ("Arnside") we have it reported on the authority of Mr. G. S. Gibson, which gives probability to the Cumberland localities also. I have a specimen from Durham, by favour of Mr. Bowman.

223. HYPERICUM ELODES, *Linn.*

Area 1 2 3 4 5 6 7 * 9 10 * 12 13 * * 16 * 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney (Neill) and Argyleshire.

Estimate of provinces 13. Estimate of counties 40.
Latitude 50—60. Atlantic (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 300 or 350 yards, in North Wales.
Range of mean annual temperature 52—45.

Native. Uliginal. Intermediate by its distribution, between the British and Atlantic types. Its apparent absence from the provinces of Trent, Tyne, East Lowlands and East Highlands, though so uniformly distributed up the western provinces, gives an Atlantic character to its area and prevalence; while, on the other hand, several localities in the province of Ouse, in connexion with the alleged one at Guisborough, in the north-east of Yorkshire, show too much of an eastern or Germanic tendency. And when we find it recorded so far north as Orkney, on the authority of Dr. Neill, it is made to appear a species of the south and north, of the west and east, — and thus one of the British type as nearly as aught else. Mr. Bowman observed it at 1000 yards of altitude in North Wales; and I think it was seen by myself rather higher on Dartmoor, in Devon.

234. HYPERICUM CALYCINUM, *Linn.*

Area (1 2 3 4 5 6 * * * * * 12 13).

Alien. Introduced into the British Isles; but being a plant which holds the ground well by its creeping suckers, it will grow and spread freely in places where it is left undisturbed, after being once introduced. As it diffuses itself very little, if at all, by seed, it can scarce be deemed a naturalized species.

HYPERICUM BARBATUM, *Linn.*

Area * [15].

Incognit. Said to have been found "by the side of a hedge near the wood of Aberdalgy, in Strath Earn," Perthshire, by Mr. Don. No other botanist having met with examples, we cannot suppose this easily-seen species to have been either native or naturalized in the one locality; and in which it is now probably extinct.

225. ACER CAMPESTRE, *Linn.*

Area 1 2 3 4 5 * 7 8 * 10 11 (12 13 14 15 16).
South limit in Devon, Isle of Wight, Kent.
North limit in Durham (and the Isle of Man).
Estimate of provinces 10. Estimate of counties 40.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in North Wales.
Range of mean annual temperature 52—47.

Native. Sylvestral and Septal. On the authority of Lightfoot's Flora Scotica, this Acer extends northwards to Kinfauns, near the town of Perth, and to Ardmaddy, in Nether Lorn. Mr. Montgomery reports it from Castle Semple, Renfrewshire; and Patrick records its existence in "woods and hedges," in Lanarkshire. All these, it is to be feared, are very suspicious localities, and to which the species is likely to have been introduced. In the Edinburgh Catalogue it is given as a doubtful native of the Forth counties. In the Flora of Berwick-on-Tweed we find it

mentioned only in a list of the introduced and imperfectly naturalized species. Winch deems it not indigenous northward of the Tyne. The name occurs in a Catalogue of plants observed in the Isle of Man, by Mr. Macnab. I have seen it in hedges in Lancashire, apparently planted. Not unlikely, however, to occur truly wild in Cheshire; and I have ventured to reckon South Wales in the provincial census, although not aware of any locality recorded for that province. In the South of England, (for example, in Devon and Surrey) it is abundant.

226. ACER PSEUDO-PLATANUS, *Linn.*

Area (1 2 3 * 5 6 7 8 9 10 11 12 13 14 * 16).

Alien? This is almost always allowed to be an introduced tree; and yet, looking to existing localities, there would seem to be quite as much likelihood of the large maple being native in this country, as of the large-leaved lime being so. It certainly propagates itself by seed, along the course of streams in several of the western counties, as those of Lancashire, Cumberland and Inverness-shire; and Winch asserts it to be "certainly indigenous on the high moors" of Tyne province. As it rises freely from seeds falling in our shrubberies, and will flourish from the north to the south coast of Britain, there can be little doubt that it would establish itself perfectly, if allowed to do so. This adaptation to the climate of Britain might be held indirectly an argument in favour of its nativity, although there is one counter argument to set against the former; namely, that the leaf-buds expand so early in spring as frequently to be damaged by frost, and that its leaves fall in the autumn earlier than those of our unques-

tioned natives. Does this apply only in the south or south-east of England?

227. Erodium maritimum, *Sm.*

Area 1 2 [3 4] 5 6 7 8 9 * [11] 12 13.
South limit in Cornwall and the Isle of Wight.
North limit in Wigtonshire and Nottinghamshire.
Estimate of provinces 10. Estimate of counties 20.
Latitude 50—55. Atlantic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends little above the coast level, in Trent.
Range of mean annual temperature 52—48.

Native. Littoral and Glareal. This is a plant of the sea-coast, rather than one of the sea-shore. Its present range along the coast runs from the Land's End, in Cornwall, eastward to the Isle of Wight, and northward to the south-west extremity of Scotland. Stated to have formerly grown on the coasts of Sussex, Kent, and Norfolk; and the former, at least, was probably correct, though the locality is no longer in existence. To the locality of "Sunderland ballast-hills" the plant had doubtless been introduced by shipping. In addition to the present narrow area along the west and south coasts, there are some inland localities on record, chiefly in the Severn province; but one of them being as far eastward as the Forest of Sherwood, in Nottinghamshire.

228. ERODIUM CICUTARIUM, *Sm.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Sutherland and the Hebrides.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in the East Highlands.
Range of mean annual temperature 52—47.

Native. Glareal and Viatical. Generally distributed, and perhaps in every county of Britain; unless the two groups of the North Isles, those of Orkney and Shetland, shall prove to be total and permanent exceptions. A variety is recorded, under name of "E. pimpinellæfolium," in the Floras of Oxford and Bedford, and also as found frequently in Battersea, by Mr. Pamplin: I have not seen specimens.

228*. ERODIUM MOSCHATUM, *Sm.*

Area 1 2 3 4 5 6 7 8 (9) 10 * (12 *. 14).
South limit in Cornwall, Dorset, Sussex.
North limit in Yorkshire and Anglesea.
Estimate of provinces 9. Estimate of counties 15.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Denizen. Viatical. So doubtful as a British plant, that the term 'Alien' might seem more appropriate than that of 'denizen.' I have rarely met with the species myself, and only in such spots and sparing quantities as seemed to indicate its origin from neighbouring cottage gardens; being cultivated for its perfume occasionally. Both Sir William Hooker and Mr. Babington admit it unquestioned, among the native species; and thus received by those botanists, I cannot properly reduce it to a lower grade of citizenship than is here assigned for it; videlicet, a species which may be native, or may be alien.

GERANIUM STRIATUM, *Linn.*

Area (1).

Alien. Has been established, to some degree, in the neighbourhood of Penzance, in Cornwall, during many years. One of the Keswick guides pretended that he had discovered it on the coast of Cumberland; but on accompanying Mr. Joseph Woods to the alleged locality, he was unable to show a single example of it *growing there*, as we are told by Mr. Woods in the Botanical Magazine. Very recently, however, Mr. G. S. Gibson has stated in the Phytologist (vol. 2, page 376) that the species "is found on the coast, near Flimby, Cumberland, plentifully, and apparently wild." It is to be feared that Mr. Gibson has here inadvertently cited hearsay information in terms which imply that he speaks from positive knowledge, and as an eye-witness to the fact. I consider the botanical statements of the Keswick guides to be utterly worthless; and there can be no doubt that false information has been purchased from them by the money of tourists, in divers instances.

229. GERANIUM PHŒUM, *Linn.*

Area (1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 * * 18).

Alien. The frequent records of this species seem to indicate much tendency to naturalize itself in this country; and yet the few localities in which examples of it have been seen by myself, were so obviously of garden origin, that I could not at all hesitate about the propriety of holding it merely 'alien' in Britain; corroborated as my own ideas on the subject are by the observations of so many botanists who have recorded localities for the species. Both Hooker and Babington, however, give it as a native; and others may likely deem it at least entitled to the intermediate term of 'denizen.'

GERANIUM NODOSUM, *Linn.*
GERANIUM ANGULATUM, *Curt.*

Area [3 * 12].

Incognit. Has been reported from Hertfordshire, Yorkshire and Cumberland; and specimens are in herbaria, alleged to have been collected in the two latter counties. Mr. Borrer, however, refers the Cumberland plant (or one of the plants alleged to have been found wild in Cumberland) to G. angulatum; which induces me to place both names here. Various particulars about the localities of these species may be seen in the Phytologist, first volume, pages 556 and 588, and second volume, pages 376 and 430.

230. GERANIUM SYLVATICUM, *Linn.*

Area [1 * 3] 4 5 * * * * 10 11 12 13 14 15 16 17 18.
South limit in Norfolk, Warwickshire, Worcestershire.
North limit in Orkney (Lowe's list) and Ross-shire.
Estimate of provinces 11. Estimate of counties 30.
Latitude 52—60. Scottish type of distribution.
A. A. regions. Midagrarian—Midarctic zones.
Descends to a trifling elevation, in England.
Ascends to 850 yards, or upwards, in East Highlands.
Range of mean annual temperature 47—36.

Native. Sylvestral. The chief prevalence of this species appears to run from Yorkshire into the Highlands. Southward, it reappears in Shropshire, Worcestershire, Warwickshire and Norfolk. Localities are also recorded in Suffolk, Berkshire, the neighbourhood of the Metropolis (D. Cooper's list) and Cornwall; but these are probably erroneous. The locality of "Kynance Cove," in Cornwall, was incorrectly published for the present species, in the Phytologist; the name having been written inadvertently instead of 'sanguineum.' Lowe's list is my only authority (as quoted in Dr. Gillies's Flora) for the occurrence of this species northward of the county of Ross; but the probability of the alleged fact may allow it to pass for evidence. Frequent on rocks and about streams up to 600 or 700 yards; rare at any higher elevations.

231. GERANIUM PRATENSE, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Dorset, Isle of Wight, Sussex.

North limit in Moray, Aberdeenshire, Argyleshire.
Estimate of provinces 16. Estimate of counties 70.
Latitude 50—58. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Channel.
Ascends to nearly 600 yards, in East Highlands.
Range of mean annual temperature 51—42.

Native. Pratal. I find no locality recorded for this plant in Cornwall or Devon. It is mentioned in a list of species observed in the Isle of Wight, by an accomplished lady botanist, Miss Twining; but it is not given as a native of that island in a list from Dr. Bromfield. Towards the other extremity of Britain, there appears no locality northward of Moray; although the altitude at which it is stated to grow in Perthshire and Aberdeenshire, might lead to an inference that the climate of the North Highlands would be quite suitable. I have not seen it higher than 500 feet in the Highland provinces. Dr. Dickie records it at 1747 feet in Aberdeenshire; and Mr. Gardiner says, "high on the mountains, as well as at their bases," in Perthshire.

232. GERANIUM PYRENAICUM, *Linn.*

Area 1 2 3 4 5 6 7 [8] * 10 (11) [12] * 14 15 16.
South limit in Glamorgan, Hants, Kent, Surrey.
North limit in Nairnshire, or about Perth, and in Bute.
Estimate of provinces 11. Estimate of counties 20.
Latitude 50—58. English (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in England.
Ascends to 100 yards, or thereabout, in Scotland.
Range of mean annual temperature 50—47.

Denizen. Viatical. It is difficult to say whether this

species is native or alien in England. If not originally a native it has become sufficiently well established in several localities to create a claim to the designation of 'denizen.' In Scotland its stations are more liable to suspicion; and there it might be fairly enough classed with the aliens. The authorities for its occurrence in the provinces of Trent and Lakes, require to be corroborated. In that of Tyne, both Mr. R. B. Bowman and the late Mr. Winch pronounced it "naturalized." In general, the proximity of old gardens, and the scanty numbers of the plants, throw doubt on the nativity of the localities; so that I can regard it only as a naturalized alien in Britain.

233. GERANIUM ROTUNDIFOLIUM, *Linn.*

Area 1 2 3 4 5 * [7 8 * 10 (11) * * 14].
South limit in Devon, Isle of Wight, Kent.
North limit in Suffolk, Northamptonshire, Warwickshire?
Estimate of provinces 5. Estimate of counties 15.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Native. Rupestral or Glareal. The recorded localities are to be received with distrust, other species having frequently been mistaken for the present. All the provinces, from North Wales to the East Lowlands, may be considered to require confirmation, before the present species can be deemed really native in them; but the fact of its occurrence about Gateshead, in the Tyne province, is fully proved by specimens collected there by Mr. Storey, of Newcastle, although probably the species was originally

carried into that province with ballast. Mr. Edmondston stated that he found it "very fine at Preston Pans," near Edinburgh. If that young botanist did not mistake the species, it was likely introduced thither also.

234. GERANIUM PUSILLUM, *Linn.*

Area 1 2 3 4 5 * 7 8 * 10 11 * 13 14 15.
South limit in Devon, Isle of Wight, Kent.
North limit in Moray, Forfarshire, about Glasgow.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Agrestal and Viatical. Should we judge of it by the localities placed on record, this would be considered rather a scarce species, although distributed over a wide area. Probably, however, it is frequently overlooked. In estimating the census I have added more than usual, and supposed it likely to occur in all the provinces up to the West Highlands, or 16, inclusively. Extended to the superagrarian zone on account of its occurrence in Moray; where, however, it is considered by the author of the Collectanea, as probably introduced.

235. GERANIUM MOLLE, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.

Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 250 or 300 yards, in the East Highlands.
Range of mean annual temperature 52—44.

Native. Agrestal, &c. The commonest species of its genus in Britain; growing in cultivated ground, by roadsides, on banks, in sandy pastures, &c. The round outline of the leaves often induces young botanists to refer examples of the present species to G. rotundifolium; and hence several erroneous localities are recorded for the latter.

236. GERANIUM DISSECTUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Sutherland, Moray, Argyleshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Agrestal, &c. The county estimate should rise to 78, if the steps between 70 and 80 were to be taken by units. As far as records show, this plant is absent from the three groups of islands which form the province of the North Isles; and as it may also be absent from the counties of Caithness, Banff, and West Inverness, the estimate cannot at present be taken so high as 80. In the Collectanea for a Flora of Moray, this species, like G. pusillum and many other agrestal plants, is marked as being "doubt-

fully native." I presume this to signify nearly the same thing as the term of 'colonist,' used in the present work.

237. GERANIUM COLUMBINUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Fifeshire and Dumbartonshire.
Estimate of provinces 16. Estimate of counties 50.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Agrestal, &c. More widely than abundantly distributed; and so very local in Scotland, as to prevent its assignment to the British type of distribution. Within the Highland provinces it is barely existent on their more southern borders; having been recorded only from the neighbourhood of Queensferry in Fifeshire, and on a rocky place between Glasgow and Dumbarton. The Queensferry locality carries it just northward of the latitudinal line of 56°. Not unlikely to occur within the Lake province.

238. GERANIUM LUCIDUM, *Linn.*

Area 1 2 3 4 5 6 7 8 * 10 11 12 13 14 15 16 17 [18].
South limit in Devon, Isle of Wight, Kent.
North limit in Ross-shire, Dumbartonshire, [Orkney ?].
Estimate of provinces 17. Estimate of counties 70.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 200 yards, in the Lake province.

Range of mean annual temperature 51—46.

Native. Rupestral and Viatical. Excepting Lowe's list of Orkney plants, I am not aware of any recorded authority for the occurrence of this species more northward than the county of Ross. It may be that 60 counties would have been a nearer estimate; though, if called on to specify those from which it is probably quite absent, I should have difficulty in selecting the dozen which have been deducted from the whole number, in the estimate given above. According to the 'London Catalogue' it is mentioned in four-fifths of the local Floras.

239. GERANIUM ROBERTIANUM, *Linn.*
239,b. GERANIUM PURPUREUM, *Forst.*

Area, general.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Orkney and Sutherland.

Estimate of provinces 18. Estimate of counties 81.

Latitude 50—60. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 500 or 550 yards, in the East Highlands.

Range of mean annual temperature 52—41.

Native. Viatical and Rupestral. Almost equally abundant as G. molle, in the two lower agrarian zones; and probably less rare than the latter in the upper agrarian zone. As it is not recorded by Mr. Edmondston, I do not venture to include Shetland in the county estimate; and yet its occurrence up to the extreme limit of the agrarian region, in the East Highland province, might justify the

expectation of finding it northward to Shetland. At the village of Castletown in Braemar, I saw plants of this species potted and housed as "geraniums," with the care which English cottagers bestow upon pelargoniums. The G. purpureum or Raii is recorded from several counties of England, ranging on the coast from Kent westward and northward to Merionethshire. The late Mr. J. E. Bowman wrote of this variety, "I have seen so many intermediate states between G. Robertianum and my friend Forster's G. purpureum, on different parts of the coast, that I think the latter can only be deemed a maritime variety."

240. GERANIUM SANGUINEUM, *Linn.*
240,b. GERANIUM LANCASTRIENSE, *Mill.*

Area 1 * 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Somerset, Essex.
North limit in Ross, Moray, Argyleshire.
Estimate of provinces 16. Estimate of counties 40.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 300 yards, in the East Highlands.
Range of mean annual temperature 52—44.

Native. Rupestral and Littoral. In numerous localities, but still one of the least general among the plants referred to the British type. In the Flora Scotica, Mr. Anderson is quoted as the authority for the occurrence of this species on the banks of Loch Rannoch, which may be about 1000 feet above the sea. I presume that it grows to 200 or 300 yards in Yorkshire. By general consent G. lancastriense is now referred to G. saguineum, and yet it is curious to see how different are their modes of growth

when kept in gardens. The dense tufts and short branches or stems of G. lancastriense give that plant a very different first-sight aspect, compared with the long-branched and diffusely growing G. sanguineum.

241. IMPATIENS FULVA, *Nutt.*

Area (* * 3).

Alien. Were not the American origin of this species well known, any botanist now finding it in Surrey and Middlesex, where it is so perfectly established, would seem well entitled to pronounce it a genuine native of Britain. The perfect naturalisation of the plant, across many miles of country, is a valuable fact for botanists and geologists; and is one that should teach the former to be less hasty in pronouncing local species "truly indigenous," which is so much the custom with smatterers in the science. Beginning considerably above Guildford, it may be traced at intervals along the river Wey, down to its junction with the Thames at Weybridge. Below this point, localities occur on both sides of the Thames; as at Walton, Kingston, Barnes, Twickenham or Isleworth, &c. From Weybridge, again, in another direction, it ascends the course of the Basingtoke Canal, to Woking Heath, if not farther; probably carried by boats or their towing ropes against the course of the slow stream of a canal.

242. IMPATIENS NOLI-ME-TANGERE, *Linn.*

Area (1 2 3 4) * * 7 (8) 9 (10) * 12 (13).
South limit in Montgomeryshire (and Derbyshire ?)
North limit in Westmorland (and Yorkshire ?)

Estimate of provinces 3. Estimate of counties 6.
Latitude 52—55. Local type of distribution.
Agrarian region. Midagrarian zone.
Descends ——? Ascends ——? (No great altitude).
Range of mean annual temperature about 48—46.

Native? Sylvestral. Whether and where this species is native in Britain, are two queries which scarcely admit of satisfactory answer. That several of its recorded localities have originated from gardens there can be no doubt; while others have so much of nature about their aspect, that various good authorities look upon the plant as truly a native. The three provinces which are excepted from the enclosures in the line of 'area,' have strong testimony in support. Thus, for North Wales, we have Mr. J. E. Bowman describing a locality thus: "road-side, below a high wooded glen, a little west of Arthog Hall, south of the estuary of the Maw-ddach, and several fields adjoining, undoubtedly wild." For the province of Mersey, we may quote Dr. J. B. Wood, thus: "Bamford Wood, near Heywood, in great abundance, and undoubtedly wild." And for the province of the Lakes, we find two other botanists of celebrity bearing witness in favourable, though less positive, terms. Mr. G. S. Gibson says: "Near Stock Gill Force, abundantly, apparently wild, though it is difficult to tell when plants so easily propagated may have been introduced. It grows on the steep sides of the Gill, both above and below the path near the mill." (Phytol. ii. 375). And Mr. W. Borrer writes: "I can scarcely doubt that Impatiens Noli-me-tangere is truly indigenous in Westmoreland. It is not confined to Stock Gill, but far up the Scandale Beck, and separated from Stock Gill by the ridge running down Snaka Moss, and in various places by Winandermere, into which lake the waters of both

these streams, after uniting with the Rothay and Brathay, are ultimately discharged. (Phytol. ii. 427).

243. OXALIS ACETOSELLA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Hebrides, Sutherland.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1300 yards, in the East Highlands.
Range of mean annual temperature 51—34.

Native. Sylvestral. This pretty plant, whose blossoms ornament our southern coppices and hedgerows in early spring, finds a climate which permits its growth in every part of Britain, unless the Shetland Isles form a real exception. In the hedgerows of Devon, we see it flowering in April; under rocks near the tops of the Grampians, its blossoms are produced in June or July. The drier summers of the south-east of England (Surrey) there banish it from the hedgerows; but it still grows under the shade of trees in damp ground or on elevated spots. It is remarkable (though not a solitary example of the fact) that this plant which is so hardy in its climate as to endure the ungenial temperature of the arctic zones, should also be so very susceptible of frost. In my garden, in Surrey, where it has some little shelter from neighbouring trees and a hedge, the leaves and flowers are often seared and destroyed by the frosty nights of April. The same thing occurs with the spring-growing leaves of Ferns, both the wild species of Surrey and those brought from the northern mountains.

It would hence seem that shade doubly operates in the distribution of plants, through its effects on their vitality and opportunity of reproduction; namely, both by affording a screen from the too fervid rays of the sun during day, and also by preserving them from the cold consequent on radiation during night.

244. OXALIS CORNICULATA, *Linn.*

Area 1 (2 3 * 5 * * * * * * * * 13 * 15).
South limit in Cornwall.
North limit in Devon.
Estimate of provinces 1. Estimate of counties 2.
Latitude 50—51. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends —— ? (But little above the coast level).
Range of mean annual temperature about 51.

Denizen. Viatical. Is this species truly a native, or simply a naturalized one? it occurs in Cornwall, Devon, Dorset, Isle of Wight, Sussex, Surrey, Gloucestershire, Lanarkshire and Stirlingshire. To the two Scottish counties it is allowed to have been introduced. There can be little question that such was the case in Surrey; as Dr. Bromfield also intimates of the Isle of Wight locality. Of the Sussex and Dorset localities suspicion may reasonably be entertained; especially as we find Dr. Salter placing it in the category of dubious natives, in his 'Botany of Poole.' Mr. Curnow reports it as found at "Bologas," in Cornwall. (Phytol. i. 1144.).

OXALIS STRICTA, *Linn.*

Area (1).

Alien. "Naturalized at Penzance, Cornwall; and Ilsington, Devon." (Bab. Man.). "Larrigan, near Penzance"; according to Mr. William Curnow, in the Phytologist. But Sir W. J. Hooker significantly remarks, that, "O. stricta is stated by Mr. Babington, in a paper read before the British Association, 1839, to be an inhabitant of *gardens* near Penzance." (British Flora, edit. 5.).

245. EUONYMUS EUROPÆUS, *Linn.*

Area 1 2 3 4 5 6 7 8 * 10 11 12 13 14.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Edinburghshire and Lanarkshire.

Estimate of provinces 14. Estimate of counties 40.

Latitude 50—56. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 150 or 200 yards, in England.

Range of mean annual temperature 51—47.

Native. Septal and Rupestral. Very local in Scotland; but the locality near Edinburgh appears a truly wild one, the shrub growing out of the crevices of rocks on Arthur's Seat and Salisbury Craigs, though very sparingly. Whether the locality in Lanarkshire is equally good, I am not prepared to say. Perhaps it grows sufficiently high, in the north of England, to justify the extension of its ascending range into the superagrarian zone, and to carry its range of temperature down to 46. It may be that the proper county estimate would come nearer to 50 than to 40.

STAPHYLEA PINNATA, *Linn.*

Area (* * 3 * * * * * * 10 * 12 13 14).

Alien. In the case of this shrub we have a striking example of the different inferences which may be drawn from the same fact. Botanists seem pretty well agreed in regarding this in the light of an introduced and scarcely naturalized species; and yet Mr. Chorley pronounces it "wild at Kensthwaite hedges, near Winandermere," and Mr. Hailstone thought it to be "truly indigenous in Yorkshire."

246. RHAMNUS CATHARTICUS, *Linn.*

Area 1 2 3 4 5 6 7 8 * 10 11 12 13 * * (16).

South limit in (Devon?), Dorset, Wight, Kent.

North limit in Dumfries-shire and Durham.

Estimate of provinces 12. Estimate of counties 40.

Latitude 50—55. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Channel province.

Ascends to 150 or 200 yards, in North England.

Range of mean annual temperature 51—47.

Native. Sylvestral, &c. Not a common shrub in England, and recorded only from Dumfries-shire, in Scotland, with the exception of "plantations in Bute," whence I have a specimen given to me by Professor Balfour, but where we may hold it planted rather than native. It may rise sufficiently high in the north of England to justify a similar extension of its range of zones and temperature with that suggested for the Euonymus.

247. RHAMNUS FRANGULA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 * 12 13 * 15.
South limit in Devon, Isle of Wight, Kent.
North limit in Moray, Ayrshire, Cumberland.
Estimate of provinces 13. Estimate of counties 30.
Latitude 50—58. English type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.
Native. Sylvestral and Septal. The rarity of this shrub in Scotland, being there found in only two localities, affords a sufficient reason for referring it to the English, rather than to the British type of distribution; and yet it has not the same predominance in the southern provinces of England, compared with the northern, which is characteristic in the distribution of other plants assigned to that type. Until recently, the only recorded Scottish locality was that in Ayrshire; but the Rev. G. Gordon informs me that this shrub has been discovered in Darnaway Wood, Moray, by Dr. Innes.

248. SPARTIUM SCOPARIUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 (18).
South limit in Devon, Isle of Wight, Kent.
North limit in Sutherland and (introduced to) Orkney.
Estimate of provinces 17. Estimate of counties 80.
Latitude 50—59. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 650 yards, in the East Highlands.

Range of mean annual temperature 51—41.

Native. Sylvestral and Ericetal. Omitted from the Shetland Flora; and in that of Orkney it is mentioned only as a species probably introduced. Excepting those two groups, and possibly the Hebrides also, it is too likely to occur in every county to warrant the reduction of its census to the next step below 80; namely, to 75. It is barely assignable to the arctic region, about the lowest borders, as far as I have seen localities. Occurs on the moors by Loch Erricht, at about 400 yards of altitude; on the Clova mountains, between 500 and 600 yards; on the Braemar moors, from 500 to 650 yards. Perhaps sown in some of these places.

249. ULEX EUROPÆUS, *Linn.*

249,b. ULEX STRICTUS, (*Mack.*) *Lindl.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 (18).

South limit in Cornwall, Isle of Wight, Kent.

North limit in Sutherland and Caithness.

Estimate of provinces 17. Estimate of counties 80.

Latitude 50—59. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends (rarely) to 700 yards, in North Wales.

Range of mean annual temperature 52—42.

Native. Ericetal and Glareal. It is difficult to decide how far northwards this shrub is truly indigenous. We do not find it recorded in the Flora of Shetland. Though included in Lowe's list of Orkney plants, Dr. Gillies denies its nativity in that group of isles, and remarks that it "can

in every case be shown to have been introduced into Orkney, and not to be an indigenous plant." Balfour and Babington say, "planted and thriving near Barvas, in Lewis," one of the Hebrides. In the north of Caithness and Sutherland, I observed it in several places, apparently wild, but it might have been sown or planted in the localities. The late Professor Graham thought it indigenous in Strath Naver, in Sutherland, where it occurs, he says, as "detached plants throughout the whole Strath, about twenty miles long." From this peculiarity of its growth, whether native or naturalized, we may infer that the climatic limit is there nearly attained; that is, where it ceases to have the vigour of growth and reproduction which enables it to become social on the commons of England, by choking and banishing most other plants. Although in one spot, on the south-east declivity of Carnedd David, seen so high as 700 yards, yet the more usual or natural limit runs nearer to 450 or 500 yards in North Wales. Winch says that it attains 650 yards in the north of England. Near Mr. Ogilvie's Shooting Cottage, on the Clova mountains, I observed it at 500 yards of altitude; but probably planted there. It may be seen sparsely near the Dee, above Castletown, say at 400 yards; though near the sites of former cottages. Occurs in Glen Clova, at 250 or 300 yards. I have estimated the lower extreme of the range of temperature, on the supposition of 600 yards being the limit in elevation, for the latitude of North Wales; the high elevation of 700 yards having been in a peculiarly favourable aspect. The Irish U. strictus is retained as a species by Mr. Babington, though now abandoned even by its original proposer, Mr. Mackay. It is a peculiar form, which is rather a monstrosity than a variety; but is propagated by seed, like many other varieties and

monstrosities. Mr. Malleson thinks that he has collected U. strictus in Sussex.

250. ULEX NANUS, *Forst.*
† ULEX PROVINCIALIS, *Lois.?*

Area 1 2 3 4 5 6 7 8 9 [10 11 12] 13 [14 15].
South limit in Cornwall, Isle of Wight, Kent.
North limit in Galloway (south of Scotland).
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 150 or 200 yards, in England.
Range of mean annual temperature 52—48.

Native. Ericetal and Glareal. Stunted examples of Ulex europæus having several times been mistaken for the present species, doubts and uncertainty arise in tracing its range and area. Though the authorities are scarce sufficient to convince, there seems sufficient probability of its occurrence in the provinces of Humber and Lakes, to justify the estimate of 12, rather than 10, for the provincial census. Sir W. C. Trevelyan first called my attention to the errors respecting this plant, which had led me to state its distribution quite inaccurately in the 'Outlines.' At the date of that volume, the Edinburgh botanists were applying the name of 'nanus' to small examples of U. europæus, from the Braid and Pentland Hills; and finding the same dwarfed forms prevailing at the highest altitudes in North Wales, I stated that "the dwarf autumnal-flowering variety generally exceeds the common one by 200 feet in North Wales." The accurate Mr. J. E. Bowman, of North Wales, appears to have made the like mistake, writing me

that "U. nanus is the common species on our hills, up to 1500 feet, generally of stunted growth." Of the subordinate variety or species, U. provincialis (Lois?), Mr. Flower says, in the Phytologist, "In plenty on the downs. This is the plant observed by some of the members of the British Association, during their meeting in this city [Bristol], and suspected by them to be Ulex provincialis" . . . "quite distinct from the present species."

251. GENISTA TINCTORIA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Edinburghshire and Wigtonshire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Pascual, &c. Grows in various situations, on heaths, in sunny pastures, under the shade of trees and coppices, &c.; perhaps a compact soil being of more influence than aspect. Although not known to grow north of the Forth, its occurrence on the Pentland Hills or Drumshoreland Moor, in the East Lowlands, may indicate the climate of the superagrarian zone, and a mean temperature as low as 46. Geographic type intermediate between the English and British.

252. GENISTA PILOSA, *Linn.*

Area 1 2 [3] 4 [5] 6 [7].
South limit in Cornwall and Sussex.
North limit in Suffolk and Pembrokeshire.
Estimate of provinces 4. Estimate of counties 4.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in Cornwall.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—49.
Native. Ericetal. Rather peculiar in its distribution; the four counties from which it is recorded being so far asunder as to give the area a considerable range of latitude and longitude, and make it include as many provinces as counties. Introduced into the Botanist's Guide, as a plant of Merionethshire, on the authority of Mr. Griffith; into the New Guide, as an inhabitant of Worcestershire, on the faith of Mr. Lees's catalogue: both these counties are probably erroneous, as other botanists do not find the species there. The name occurs in the list of Metropolitan species, by D. Cooper; but I cannot discover that he gives any locality for it, in that mass of confusion and blunders — the Flora Metropolitana.

253. GENISTA ANGLICA, *Linn,*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire, Aberdeenshire, W. Inverness.
Estimate of provinces 17. Estimate of counties 70.

Latitude 50—58. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 700 or 750 yards, in the East Highlands.
Range of mean annual temperature 52—40.

Native. Ericetal. Though frequent in Britain, this is considerably less so than the Ulex europæus or Spartium Scoparium; while it ascends higher than those allied shrubs, on the northern mountains. I observed it on the moors of Aberdeenshire, as high as 2000 feet in several places; the highest spot marked for it in my note-book, being 2200 feet, on the hills near Castletown.

254. ONONIS ARVENSIS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Sutherland, Ross, Argyleshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—46.

Native. Glareal. Here again I feel at a loss whether to estimate the county census at 80, or at 75. The apparent absence of the species from the North Isles, would bring the estimate down to 79; those three groups being reckoned as three counties. But if it grows in all the counties of the main land, the estimate would still be nearer to 80 than to 75. Were not the earlier pages of the volume printed off, before this remark is penned, I should be now tempted to introduce a middle estimate, of 78, between those two

numbers; such an intermediate estimate to apply to the species which are apparently absent from the three groups which constitute the province of North Isles, and yet probably to be found in all or very nearly all of the other counties. Notwithstanding the northern range of this species, I have never seen it in the Highland valleys.

255. ONONIS SPINOSA, *Linn.*

Area 1 2 3 4 5 6 * 8 * 10 11 12 13 14 * 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Haddingtonshire and Dumbartonshire.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—56. English (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Pascual. The present species having been frequently regarded as a variety of O. arvensis, its distribution is yet imperfectly known. In several catalogues, the name of O. arvensis is used for the two species jointly, or for either of them; and thus, in estimating their range and area partly from such lists, it will happen that the present species is made to appear comparatively much more rare In the London Catalogue, O. arvensis is marked as mentioned in all the twenty local Floras; while O. spinosa is given in only eleven of them. But probably this shows rather the use of the names, than the true distribution of the two species themselves.

256. ONONIS RECLINATA, *Linn.*

Area (13).

Alien. "Among the debris at the foot of the cliff overhanging the rocky shore, on the west side of the Mull of Galloway. It is undoubtedly wild." (Professor Graham, 1835.). If I am not mistaken, Dr. Graham afterwards expressed a much less confident opinion on the nativity of the plant in Scotland. Ononis ramosissima was found on ballast heaps, in Fifeshire, in 1834; but is stated to have since disappeared.

257. ANTHYLLIS VULNERARIA, *Linn.*

Area, general.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Shetland, Orkney, Hebrides.

Estimate of provinces 18. Estimate of counties 75.

Latitude 50–61. British type of distribution.

A. A. regions. Inferagrarian—Midarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 800 yards, in the East Highlands.

Range of mean annual temperature 52—38.

Native. Pascual and Rupestral. I find this plant recorded from 55 counties only; being one not usually included in the lists of the 'rarer plants.' But as it is mentioned in 19 of the 20 local Floras (London Catalogue) and extends the whole length and breadth of Britain, we may fairly infer that it is not likely to be absent from more than a few of those counties for which we still want local lists of their common species. It is, however, not so

general a plant, that we can safely assume its occurrence in every county. There are certainly many spaces of country, ten or twenty miles in diameter, from which the Anthyllis appears to be wholly absent. Far from frequent on the Highland mountains, above 400 or 500 yards; but it does occur so high as the locality of Astragalus alpinus, in Aberdeenshire, which I guessed at 2500 feet, and which was afterwards measured by Dr. Dickie, who found it to be between 2400 and 2500 feet. Mr. Gardiner has observed the Anthyllis on the rocks of Stuich-an-lochan, which may somewhat exceed the height of the Astragalus locality on Little Craig-an-dall.

258. MEDICAGO SATIVA, *Linn.*

(Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.)

Alien. Frequently sown by farmers, and will maintain its ground for a few years, where introduced. The number of provinces in which it has been observed, indicates that it is not very fugitive; but nobody seems to hold it a native.

259. MEDICAGO FALCATA, *Linn.*

Area [1] 2 3 4 * [6] * * * (10 11).
South limit in Dorset, Sussex, Kent.
North limit in Norfolk and Cambridgeshire.
Estimate of provinces 3. Estimate of counties 7.
Latitude 50—53. Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends——? Ascends——? (At a slight altitude.)
Range of mean annual temperature 51—48.

Denizen. Glareal. In the British Flora, this is marked as a species "naturalized by the agency of man;" in the Manual of British Botany, it is given as a genuine native. I find it recorded from the counties of Devon, Dorset, Sussex, Kent, Surrey (Mr. Ellis, ms.), Hertford, Suffolk, Norfolk, Cambridge, Glamorgan, York and Northumberland. Devon stands upon the uncorroborated authority of Polwhele. The Report, by Webb and Coleman, leaves Hertford in an equally unsatisfactory condition. In Glamorganshire, Mr. E. Forster saw "Medicago falcata, floribus purpureis," which was probably some mistake about M. sativa. A locality, "near Hovingham," is recorded in the Yorkshire Flora; and another, "on ballast hills," &c., in that of Northumberland and Durham. The species may be native in Norfolk, Suffolk, and some other eastern counties, south and west of those two.

260. MEDICAGO LUPULINA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire, Aberdeenshire, Argyleshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Agrestal, &c. Even this plant, so profusely abundant in England, is apparently not general in its distribution; being wholly omitted from the lists of species ascertained in the three groups of the North Isles, and equally so from my own notes of those observed in Suther-

land and Caithness; though I am tempted to suppose that I may have passed it by, unnoted, in the latter counties. In Moray, it is said to be frequent, but not very common; about the town of Aberdeen, common; about Edinburgh, very common; about Glasgow, occasionally. The name does not occur in my lists of species observed in various valleys of the Grampian mountains; though duly entered in those made about the towns of Stirling, Perth, and Inverness.

261. MEDICAGO MACULATA, *Sibth.*

Area 1 2 3 4 5 * 7 8 * 10 (11 * * * 15).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Yorkshire, Caernarvonshire, Anglesea.
Estimate of provinces 9. Estimate of counties 25.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Native. Agrestal or Viatical. A scarce plant, excepting in some of the southern and south-eastern counties. The East Highland province is numbered in the area, on account of a locality or two in Fifeshire, whither it has probably been carried; and the same may be inferred respecting the localities in the province of Tyne; namely, on ballast hills, and under the Banqueting House at Alnwick. The locality of Scarbourgh is cited in the Flora of Yorkshire; and the plant is said to be common about Nottingham.

262. MEDICAGO DENTICULATA, *Willd.*
262,b. MEDICAGO APICULATA, *Willd.*

Area 1 2 3 4 * * * * * * * * * * (15).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Norfolk (and Cambridgeshire?).
Estimate of provinces 4. Estimate of counties 9.
Latitude 50—53. Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the province of Channel.
Ascends scarcely, if at all, above the coast level.
Range of mean annual temperature 52—49.
Native. Glareal (?) and Sub-littoral. In the counties of Devon, Dorset, Hants (Isle of Wight; Dr. Bromfield), Sussex, Kent, Essex, Suffolk, Norfolk, and Cambridge. Has been found also at Aberdeen, doubtless introduced to that more northerly coast.

263. MEDICAGO MINIMA, *Linn.*

Area [1] * 3 4 * [6].
South limit in Kent [and Somerset?]
North limit in Norfolk [and Glamorgan?]
Estimate of provinces 2. Estimate of counties 5.
Latitude 51—53. Germanic (?) type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Channel province.
Ascends scarcely above the coast level.
Range of mean annual temperature 50—49.
Native. Glareal. Reported to grow in the counties of Kent, Suffolk, Norfolk, Cambridge, Somerset and Gla-

morgan. The three or four first may pass undisputed. The county of Somerset is named, because the species is included in the Flora of Bath, on the faith of Dr. Davis; and that of Glamorgan, on account of Mr. Lees stating that he "gathered this on the descent of a steep rock in Oxwich Bay, in 1839." (Phytol. i. 378). Without some confirmation, upon higher or more exact botanical authority, it seems better not to give the M. minima as certainly known in those two south-western provinces. But to the four eastern counties, enumerated above, possibly that of Surrey may be added, on the faith of specimens, very young and prematurely shrivelled up by drought, which were collected on Epsom Downs, by Mr. Twining.

MEDICAGO MURICATA, *All.*

Area [4].

Incognit. "At Orford in Suffolk, on the sea-bank, close by the sea, plentifully." (Ray's Synopsis, 333). "I have omitted M. muricata, being convinced from personal observation that no such plant now exists 'on the sea-bank at Orford.'" (Babington's Manual).

264. MELILOTUS OFFICINALIS, *Lam.*

Area 1 2 3 4 5 6 * 8 * 10 11 * 13 14 15.
South limit in Cornwall, Isle of Wight, Kent.
North limit in (Aberdeenshire ?), Fifeshire, near Glasgow.
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.

Ascends to 50 or 100 yards, in England.

Range of mean annual temperature 52—47.

Denizen. Viatical, &c. Not a common plant, although it occurs pretty frequently in the southern provinces, particularly near the coast; and it may be truly a native in England. Scarce, and dubiously indigenous in Scotland. Is said to occur occasionally on the Inch, at Aberdeen; but I do not include that locality in the latitudinal range, on account of the great probability that the species has been originally carried thither from some more southern locality. Hooker and Babington both allow this to be a true native. Probably several of the localities, formerly put on record for this species, may belong to M. alba.

265. MELILOTUS ALBA, "*Desr.*"

Area (* 2 3 4 5 6 * * 9 10 11 12 * 14).

Alien. Both Hooker and Babington enumerate this as a true native. On my own part, I have hesitated whether to unite it with the 'denizens' or 'colonists,' rather than to throw it into the rank of an 'alien'; but the fugitive endurance, and the suspicious nature of its localities, induce a change of opinion from that indicated on p. 63. I think that it is somewhere mentioned, as occuring near Plymouth, but I find no memorandum to this effect among my notes. In the 'Botany of Poole,' Dr. Salter gives only the locality of the "ballast quay Ham;" which reads suspiciously enough. In a catalogue of the plants of the Isle of Wight, given to me by Dr. Bromfield, it is marked as an introduced species. Occurs in several places in Surrey, and may still be seen along the lines of the South-western and the Richmond Railways; particularly about Wandsworth, and nearer the Terminus at Nine Elms. From some other

places by the South-western Rail, where it flourished during the formation of the line, it has gradually disappeared. Mr. Coleman found it near the gas-works, at Hertford, on the gravel heaps thrown up in digging a canal. Miss Bell found it among lucerne, at Hilgay, in Norfolk; and Hooker records it from the denes, at Yarmouth. Mr. Charles Prentice informs me that it abounds in one spot on the railway embankment, between Swindon and Birmingham; and it may be an old inhabitant of Warwickshire, for the Rev. W. T. Bree enumerates the M. officinalis among plants varying with white flowers, about Coleshill, in the first volume of the Magazine of Natural History. The Rev. J. Shawe sent me a specimen which he had found in a clover field, near Leominster. Mr. Gutch enumerates it in his second list of Swansea plants, as occurring on ballast heaps, near the West Pier. Found near Warrington, by Dr. Kendrick. Occurs near Bishopsthorpe and elsewhere, according to the Flora of Yorkshire, without authority. Mr. Storey and Mr. R. B. Bowman both send me specimens from the ballast hills of the Tyne province. In the Isle of Man, according to Mr. Forbes. Localities are given in the Flora of Berwick, for this species, under the name of Trifolium officinale, in a quarry, in a wood, and in plantations. Mr. Lloyd is stated to have found it in corn-fields, at Aberlady, in Haddingtonshire. The late Professor Graham found it abundantly in a deserted quarry on the banks of the Union Canal, near Edinburgh. Most of these, it will be granted, are highly suspicious localities, when the question of nativity is under consideration. The habitat of "ballast heaps" can weigh nothing in favour, and much against. Fields of "clover" and "lucerne" are almost equally to be suspected; because the seeds for sowing are frequently imported. To "quarries" this Melilotus might readily be conveyed among clover, or other

provender for horses; and it might be scattered along the lines of railways, in the same manner. The very numerous seeds (thousands) which a single plant will produce, when growing freely on fresh-moved and comparatively cleared ground, may well account for the abundance of the plant, after a first crop, though only of a few or single plants, has shed its seeds. On the whole, it seems better to regard this species in the character of an alien, unless more satisfactory localities be ascertained. It is likely enough to establish itself on our coasts, and thus become a denizen: its biennial existence being an obstacle against its becoming an agrestal colonist, like other plants which have been imported with corn or other seeds.

266. TRIFOLIUM ORNITHOPODIOIDES, *Linn.*

Area 1 2 3 4 5 * 7 * * [10] * * 13 14 15.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ayrshire, Fifeshire, (Forfarshire?)
Estimate of provinces 10. Estimate of counties 20.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Native. Glareal and Sub-littoral. Chiefly near the coast, though several inland localities are also recorded. Some of the latter are probably erroneous, and among the probable errors it seems advisable to put the Tadcaster locality, where Willisel supposed that he found this species among corn, which is an unlikely situation for it. In Baines's Flora of Yorkshire the locality is cited without comment, although the only one given for the species;

indeed, even the authority is not quoted. *A propos* of that Flora, the author must have acted under the worst possible advice, in publishing a local Flora on such a preposterous plan. It is a mere compilation of localities, with all that gave scientific value to them cut away; that is to say, the localities are copied, and the authorities for them are omitted! This reduces those cited on the best authority, to the low level of those cited on the worst authority!!

267. TRIFOLIUM REPENS, *Linn.*

Area general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 900 yards, in the East Highlands.
Range of mean annual temperature 52—38.

Native. Pascual. One of our most universally distributed species, throughout the agrarian region, and rising to the inferarctic zone on many of the hills; but seldom seen in the midarctic zone. The popular notion that the application of lime, as a manure to the ground, will produce this species of clover, is doubtless erroneous; but, like many other popular errors, there may be a semblance of truth in it. Lime is seldom applied to those spots in which this plant is not likely to be already existent, with the exception of corn-fields, where the application of lime is not followed by any particular increase of clover. Favoured by the fertilizing or drying qualities of the lime,

and often by the coincident breaking up of the land, the Trifolium repens rapidly becomes luxuriant in size and quantity, and produces numerous flowers on elongated peduncles. It thus becomes conspicious to the eyes of those casual observers who overlooked it in its previous weakly, stunted, flowerless or feebly-flowering condition, half hid by taller herbage. The turning up of the soil does not destroy the white clover, as it destroys many other kinds of plants; for its creeping stems, ever ready to throw out roots, and to regain hold of the ground although cut in pieces, afford natural means of rapid increase, such as are not possessed by many of the plants which would be its companions on those infertile grounds which are sought to be improved by turning and liming.

268. TRIFOLIUM SUBTERRANEUM, *Linn.*

Area 1 2 3 4 5 * 7 8 * * [11].
South limit in Cornwall, Isle of Wight, Kent.
North limit in Anglesea and Nottinghamshire.
Estimate of provinces 8. Estimate of counties 25.
Latitude 50—54. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Native. Glareal. As this species may be easily overlooked by botanists, and there seems no reason for presupposing its absence from the province of South Wales, an addition of one is made to the provincial estimate. Doubtful whether 20 or 25 would be the truest county estimate: at present, the species is recorded only from 17 or

18. Formerly found on ballast hills in the province of Tyne; where it is now extinct.

269. TRIFOLIUM OCHROLEUCUM, *Linn.*

Area [1 2] 3 4 [5 * * 8 * 10 11].
South limit in Kent (or Sussex).
North limit in Norfolk and near Stamford.
Estimate of provinces 3. Estimate of counties 9.
Latitude 51—53. Germanic type of distribution.
Agrarian region. Inferagarian zone.
Descends to the coast level, in the Thames province.
Ascends to 50 or 100 yards, in Thames or Ouse.
Range of mean annual temperature 49—48.

Native. Glareal? Considerable uncertainty and some errors attend the distribution of this plant, as recorded in books. In preparing the New Guide, a locality was accidently misplaced to this species, instead of T. maritimum, under the county of Somerset. Pulteney says "I have collected this in Dorset, but am uncertain where;" and it is enumerated in Dr. Salter's (partly, *compiled*) list of plants within 16 miles of Poole. In Hasting's 'Illustrations,' we are informed that it grows "on the Link, at Malvern;" and Mr. Lees says that it is "not common" in Worcestershire (N. B. G.). A single specimen is stated to have been found in a clover field, near Ripon, in Yorkshire. It has also occured on ballast hills, in the province of Tyne. These are all insufficient reasons or authorities for retaining the first, second, fifth, tenth and eleventh provinces in the area of the species. By Hudson, it is intimated that the plant has been found near Stamford, which is a sufficiently probable locality. But that town being just on the borders of the Ouse province, although on the Trent

province side of the river Welland, which divides the two provinces, I do not add the latter to the provincial area, until it may appear correct to do so. At the other extremity of its area, we find the plant stated to grow near Tonbridge Wells, which carries it close to the borders of Sussex, in the province of the Channel. Thus, while the species certainly occurs in two, it may occur in four, of the eastern provinces; the estimate being set above at 3. "Dry gravelly soils in the East of England." (Bab. Man.).

270. TRIFOLIUM INCARNATUM, *Linn.*

Area (uncertain).

Alien. Of late years this has been frequently sown; and as straggling examples occur here and there, it finds mention in some of our catalogues of British plants.

270,b. TRIFOLIUM MOLINIERI, *Balb.*

Area 1.

South and North limit in Cornwall.

Estimate of provinces 1. Estimate of counties 1.

Latitude 49—50. Local or Atlantic type of distribution.

Agrarian region. Inferagrarian zone.

Descends —— ?

Ascends —— ? (At or near the coast level).

Range of mean annual temperature 52.

"Native." Pascual or Rupestral? A recent addition to the flora of England; and regarded as a variety of the introduced T. incarnatum. Though it is very like the latter, I am not clear that they ought to be regarded as one identical species; and the statements of the Rev W. S.

Hore go far in evidence of this variety or species being a true native. In the Phytologist (ii. 237.) Mr. Hore writes, "As to this Trifolium being decidedly indigenous, the shadow of a doubt cannot be entertained by any one who has seen it growing in another locality near Kynance Cove, which we subsequently detected. There, on the side of a ravine, quite out of sight of any land which has been cultivated, it grows in the greatest luxuriance, forming a large portion of the herbage. Years and years must have elapsed under the most favourable circumstances to have allowed it to have taken possession of such a residence, and to have ejected the previous possessors, supposing that it had been cultivated within a moderate distance of this locality. But the summit of the cliff appears never to have been broken by the plough, and the turf is as compact and solid as can be imagined, producing the ordinary plants of the district. I also made inquiries respecting the cultivation of the Trifolium incarnatum, and found that it was not known in the neighbourhood." It may be worth inquiry, whether this be the Trifolium stramineum of Presl, of which I have never seen specimens.

271. TRIFOLIUM PRATENSE, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 600 yards, in the East Highlands.
Range of mean annual temperature 52—41.

Native. Pratal. It is impossible to say where this is a genuine native, or where its present existence may be attributed to a former introduction. But wild it now certainly is throughout the agrarian region, and occasionally ascending a short distance up the lower arctic zone.

272. TRIFOLIUM MEDIUM, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Ross.
Estimate of provinces 18. Estimate of counties 75.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 yards, in the East Highlands.
Range of mean annual temperature 51—43.

Native. Rupestral and Pratal. Less common than T. pratense, which it so much resembles that some botanists have supposed it to be the original or wild stock of that species; and it is doubtless often overlooked through the close similarity. More frequent in the north of England and low tracts of Scotland, decreasing towards the southern and northern extremities of the island, and also on the mountains. I think to have seen it at 500 yards, or upwards, in Cumberland; but this is said only on vague recollection.

273. TRIFOLIUM MARITIMUM, *Huds.*

Area 1 2 3 4 5 * 7 * * (10).
South limit in (Cornwall ?), Dorset, Kent.

North limit in Norfolk, Monmouthshire, Merionethshire?
Estimate of provinces 6. Estimate of counties 12.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coasts of the Channel.
Ascends, on the coast, to the Ouse.
Range of mean annual temperature 52—49.

Native. Littoral. A scarce plant, though not unlikely to be found in other localities on the western coasts than those hitherto recorded for it. In Cornwall (Maton, in B. G.), Somerset, Dorset, Sussex, Kent, Essex, Norfolk and Monmouthshire; also in Merionethshire, according to the Rev. W. Wood, in Bot. Guide; and on the ballast hills, in the province of Tyne. Though not unlikely localities for the plant, it would still be desirable to have those on the coasts of Cornwall and Merioneth confirmed by some modern observer. If truly found in the latter county, it will probably be so in South Wales likewise, and thus raise the provincial estimate to 7 certain; but since South and North Wales are both uncertain as yet, only one of those provinces is taken into the estimate of 6.

274. TRIFOLIUM STELLATUM, *Linn.*

Area [1] (2) [3].

Alien. Has been recorded from the coasts of Somerset, Sussex, Kent and Essex. Three of the counties are probably erroneous; that of Sussex being correct. Though likely imported originally with ballast, this Trefoil is now almost a denizen. The locality is thus described by Mr. Borrer, in the first volume of the Phytologist:—"It will be satisfactory to your correspondent Mr. Salmon, to learn that Trifolium stellatum is not lost at Shoreham, but still

comes up in abundance every spring in its first-observed station—a low line of ballast-heaps, deposited, I am assured, before any present inhabitant of Shoreham can recollect, between the river and wide bed of shingle on the seaward side of the river, over against the east end of the town. The plant flowers early, and a less abundant second crop is usually to be seen in the latter summer months. I once, several years ago, met with a few specimens among the shingle, over against Southwick; and again, on a part, now occupied by a quay, of the landward shore of the river at Kingston."

275. TRIFOLIUM ARVENSE, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Devon, Isle of Wight, Kent.
North limit in Ross, Moray, Islay.
Estimate of provinces 17. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel province.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.
Native. Glareal. More of a southern than a northern species; but said to be frequent about Edinburgh, and very common in Moray. Should the county estimate be raised to 70?

276. TRIFOLIUM SCABRUM, *Linn.*

Area 1 2 3 4 5 6 7 8 * 10 11 * * 14 15.
South limit in Cornwall, Isle of Wight, Kent.

North limit in Kincardineshire and Anglesea.
Estimate of provinces 13. Estimate of counties 40.
Latitude 50—57. English (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Native. Glareal. Although running up the eastern counties from Kent to Kincardine, its western range extends only from Cornwall into Denbigh and Anglesea, as far as hitherto recorded. Its type of distribution thus comes between the Germanic and British, or the south-eastern and general; and yet more nearly corresponding with the English than with either of those two. Very likely to occur in the province of Trent, but it would be desirable to have the fact confirmed by more recent authority than that of Pulteney.

277. TRIFOLIUM STRIATUM, *Linn.*

Area 1 2 3 4 5 * 7 8 * 10 11 12 * 14 15 * * (18).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Kincardineshire, Stirlingshire, Isle of Man.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Glareal. This species and T. scabrum frequently grow intermixed; and being collected together, the specimens are labelled as those of a single species, with either name, accordingly as the specimens of the one

or the other happen to be examined. This error simply suppresses the locality for one of the species, without giving rise to a false one; but when the mislabelled specimens fall into the hands of young botanists, as authentic examples of the species whose name they bear, they naturally mislead, and occasion the assignment of other localities to the wrong species. On this account, and because the two species are otherwise often mistaken, the recorded localities require to be received with some degree of caution. I have added two to the provincial estimates, deeming the species very likely to occur in some of those western provinces which are left blanks above in the line of area. Dr. Neill records this species as seen in Orkney; but that locality appears too wide a leap northward to be admitted as a truly native one; especially since it remains unconfirmed by Gillies, Duguid, or others.

† Trifolium Bocconi, *Savi.*

Area 1.

South and North limits in Cornwall.

Estimate of provinces 1. Estimate of counties 1.

Latitude 50. Local or Atlantic type of distribution.

Agrarian region. Infragrarian zone.

Descends — ? Ascends — ? (At or near the coast level).

Range of mean annual temperature 52.

Native ? Glareal or Rupestral. Near Ruan Minor, on the western wall of the road leading towards Cadgewith, where it was originally discovered by Mr. Babington, in 1839. "Whether the plant be indigenous or introduced, would be difficult to say: had we discovered it in an additional spot, we should both have firmly asserted the former." —(Rev. W. S. Hore, in Phytol. ii. 237).

TRIFOLIUM RESUPINATUM, *Linn.*

Area [* 2 * * 5].

Alien or (now) Incognit. Discovered by Mr. Drummond, in meadows below Shirehampton, near Bristol; where it soon became extinct. Subsequently found by Dr. T. B. Salter, in the neighbourhood of Poole, in Dorsetshire; where, also, it had become nearly extinct by 1838. I am not aware of any botanist having since met with the species in England. Dr. Salter writes, in the Botany of Poole, "In 1831, I discovered this second British station of Trifolium resupinatum, *L.*, at the east end of the rope-walk, close by the anchorage at Ham. . . . The plant was always confined to a few square yards in the above-named situation. . . . . I fear from its being so near the ballast quay, it can scarcely be considered indigenous, and I am sorry also to add, that of late it has become nearly extinct."

278. TRIFOLIUM GLOMERATUM, *Linn.*

Area 1 2 3 4 * 6 [7 8 * * 11].

South limit in Devon, Isle of Wight, Kent.

North limit in Norfolk and Glamorgan.

Estimate of provinces 5. Estimate of counties 9.

Latitude 50—53. English (?) type of distribution.

Agrarian region. Inferagrarian zone.

Descends to the coast level, in the Peninsula.

Ascends to 50 yards, or less, in England.

Range of mean annual temperature 51—49.

Native. Glareal. A local species, the distribution of which would belong to the Germanic type, so far as this

country is under view, were there not two exceptions, by the alleged localities in Devon and Glamorgan; each resting on the accuracy of a single botanical observer. But since there appears no improbability of this species being indigenous in the south-western counties, the two localities may pass undisputed, although it would be desirable to find them confirmed by some of the accurate and active botanists of the present time. Besides these two counties, the same species is recorded from Dorset, Hants, Kent, Surrey, Middlesex, Suffolk, Norfolk, Leicestershire, Denbighshire, and Durham; the three last clearly requiring confirmation: indeed, in the last of the three the plant appears only to have formerly occurred on the ballast hills of Wear, without persistence.

278*. TRIFOLIUM STRICTUM, *Linn.*

Sarnian. "Jersey, *Mr. J. Woods.* A single dwarf specimen found in 1842 by *Mr. W. W. Newbould.*"—(Bab. Man.)

279. TRIFOLIUM SUFFOCATUM, *Linn.*

Area 1 2 3 4 * * 7.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Anglesea and Norfolk or Suffolk.
Estimate of provinces 6. Estimate of counties 10.
Latitude 50—54. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, at the coast level, to North Wales.
Range of mean annual temperature 52—49.

Native. Glareal and Sub-littoral. Recorded from the counties of Cornwall, Devon, Isle of Wight, Sussex (doubtfully), Kent, Suffolk, Norfolk (or its borders), and Anglesea. I venture to include South Wales in the census of a species which occurs in North Wales and the Peninsula, and is, by its small size, as well as inconspicuous flowers, so likely to be overlooked. The locality of "Yarmouth denes" may relate only to the county of Suffolk.

280. TRIFOLIUM FRAGIFERUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * * 14 15.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Fifeshire and Lancashire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—48.

Native. Pascual. Not strictly a pascual plant, and yet nearer to that group than to any other single one. Damp places on commons and by roadsides, and the vicinity of the coast, are the usual situations in which this Trifolium flourishes; so that it may be deemed a pascual species approximating also to the paludal and littoral, and even to the ericetal and viatical groups. Seems likely to be found in the Lake or West Lowland provinces.

281. TRIFOLIUM PROCUMBENS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and Ross-shire.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.
Native. Pascual. Abundant in England; becoming much less common in the Highland provinces, and seen only by Dr. Neill in that of the North Isles.

282. TRIFOLIUM FILIFORME, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire and Argyleshire.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.
Native. Pascual, &c. This species will probably occur farther northward than the county of Ross, as it is reported to be more common than the preceding species about Aberdeen and in Moray. But there is an uncertainty or confusion concerning them which I am not pre-

Latitude 50—55. English type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 600 yards, in the province of Humber.

Range of mean annual temperature 51—42.

Native. Rupestral and Pascual. If this plant ascends to the summit of Cronkley Fell, it may there be almost or quite within the arctic region; that hill being estimated at 2000 feet or thereabouts, in some publications. A species which ascends so high in England might be expected to occur also in Scotland; but hitherto the only recorded Scottish locality appears to be that of "Dundonald Castle, near Ayr, upon ground of a chalky nature,"—the wording of which gives rise to some suspicion of inaccuracy in the observer by whom it was reported to the Author of the Flora Scotica.

CORONILLA VARIA, *Linn.*

Area [1 and 12].

Incognit. This plant is supposed to have been found somewhere in the Lake province; also at Berry Head and Linton, in Devon. The particulars are carefully set forth by Dr. Bromfield, in the Magazine of Natural History (v. 604), but do not fully warrant the inclusion of the species in British lists, until confirmed.

201. ONOBRYCHIS SATIVA, *Lam.*

Area 1 2 3 4 5 * (7) 8 * 10 11.

South limit in Somerset, Isle of Wight, Kent.

North limit in Durham (and Anglesea ?)

Estimate of provinces 8. Estimate of counties 20.
Latitude 50—55. Germanic (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—48.

Native. Pascual. Being frequently sown by agriculturists, this species has become naturalized, to some degree, in habitats in which it is not a native. As a truly indigenous production, it is found chiefly or exclusively on the chalk and limestone tracts of the eastern provinces, but extending also into the sub-western province of Severns and the county of Somerset, in the province of the Peninsula. For the other western provinces I find only one locality, in Anglesea, and hesitate to receive this as a western 'outlier' until confirmed. The type of distribution appears to be intermediate between the English and Germanic; and although I can not prove it to be really native in Anglesea, we must refer the former type for it.

295. VICIA OROBUS, *De C.*

Area [1 * * * 5] 6 7 * * [10] 11 12 13 14 15 16.
South limit in Caermarthenshire and Durham.
North limit in the Isle of Skye and Forfarshire.
Estimate of provinces 8. Estimate of counties 20.
Latitude 51—58. Scottish type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends nearly or quite to the coast level.
Ascends to 100 or 200 yards, if not more.
Range of mean annual temperature, say 48—46.

Native. Rupestral, &c. Several doubts and uncertainties attend the distribution of this plant. It has been

said to grow in Somerset, Worcestershire and Shropshire; and though these counties cannot be considered very unlikely, they rest only on rather doubtful authority. The county of York was published for it in the New Guide, through an inadvertence; Orobus sylvaticus having been marked in a printed list, accidentally, instead of Orobus tuberosus. The same locality in that county, however, has been since re-stated on a second authority; but I do not include the locality of "Richmond" within the area of this species, until it appears that the second announcement is something better than a plagiarism of the former error. I am at a loss how to indicate the range of altitude, and consequently that of temperature also. Most of the stations probably lie between 50 and 200 yards; and whether any of them are below or above this range of elevation, I am quite unprepared to say with certainty. There is uncertainty, again, in giving the usual situation of the species; for it seems to be as much a pascual or sylvestral plant as a sylvestral one.

296. VICIA SYLVATICA *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.

South limit in Devon, Isle of Wight, Kent.

North limit to Kincardine, Aberdeenshire, Argyll.

Estimate of forms 17. Estimate of comm[illegible]

Latitude 50—56. British type of distribution.

Affinities [illegible]—Superagrarian—Superalpine.

Descends nearly to the coast level, in the Peninsula.

Ascends to 500 yards, in the East Highlands.

Range of mean annual temperature 50—42.

Native. Sylvestral. Not a common species, although widely distributed, and occurring in numerous localities.

It is doubtful whether the estimate of 50 or that of 60 counties would be nearest truth; at present, there are not recorded localities for so many as 50. But as this is a plant whose habitats occur chiefly in the northern and western provinces, for which we have the least complete local lists, I have thought that 50 would be too low an estimate.

297. VICIA CRACCA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Extent of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Altitudinal regions. Interagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 800 yards, in the East Highlands.
Range of mean annual temperature 51—38.

Native. Septal, &c. In hedge-rows and copses at a moderate elevation, but above the midagrarian zone it becomes a plant of the moors and pastures, producing short racemes of deeper coloured flowers, and ceasing to be a climber in such situations. I have however, seen climbing plants of this species, with long racemes of numerous pale (almost white) flowers, at 350 yards of altitude, in Aberdeenshire; though I suspected these to have been introduced with agricultural seeds. Very rare above the agrarian region; but occurs with the Astragalus alpinus on Little Craigandall.

298. VICIA SATIVA, *Linn.*
298,b. VICIA ANGUSTIFOLIA, *Sm.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in (Shetland ? Orkney ?) Hebrides.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.
Native. Glareal, &c. Distributed over the country by agricultural sowing ; and spread by nature in its narrow-leaved form, pretty frequently, and almost as widely. Mr. Edmondston deemed it not really native in Shetland ; and for Orkney, we have only the authority of Lowe's list ; but Balfour and Babington apparently considered it native in the Hebrides. I saw the V. sativa at Dalnacardoch, 350 yards in elevation, probably naturalized. V. angustifolia extends northwards to Moray ; and it is reported from all the provinces southward of the Highlands.

299. VICIA LATHYROIDES, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire, Aberdeenshire, Dumbartonshire
Estimate of provinces 17. Estimate of counties 50.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in Scotland.

Range of mean annual temperature 52—47.

Native. Glareal. Much confusion has occurred between the localities for this species and V. angustifolia; small examples of the latter being frequently mistaken for the present species. The area is given chiefly on the faith of other eyes than my own; but I do not feel entitled to dispute any of the provinces set forth above, although it would be desirable to have confirmations for those of the Moray, Trent, Humber and Lakes.

300. VICIA LUTEA, *Linn.*

Area 1 2 * 4 * * * [8] * * * [12] 13 * 15.

South limit in Cornwall and Sussex.

North limit in Kincardineshire and Ayrshire.

Estimate of provinces 5. Estimate of counties 9.

Latitude 50—57. Local type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Ascends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards (?) in England.

Range of mean annual temperature 52—47.

Native. A local plant, peculiarly distributed.

Cornwall, Somerset, Dorset,

of some

and Kincardine.

the V. lutea is recorded

in Cumberland, on the

guide, of the name of Hutton. There is also the

of "Dunure Castle," on account of which the West Low-

land province and the county of Ayr are enumerated above: but is "Dunure Castle" in Ayrshire?

VICIA HYBRIDA, "*Linn.*"

Area [1 and 8].

Incognit. Glastonbury Tor Hill, in Somerset, and Swan Pool, in Lincolnshire, are the localities recorded for this species in our Floras. I have not seen specimens; and it appears that the existence of any such species in England is a highly dubious matter. The V. hybrida, of Hudson's Flora, is referred to the next species.

VICIA LAVIGATA, *Sm.*

Area [2]

Incognit. Formerly found in Dorsetshire, where it appears to be now extinct. Were not both this and the preceding (V. hybrida) mere varieties of V. lutea, which have not proved persistent?

301. VICIA SEPIUM, *Linn.*

Area, general.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Orkney, Sutherland, Hebrides.

Estimate of provinces 18. Estimate of counties 81.

Latitude 50—60. British type of distribution.

A. A. regions. Inferagrarian—Inferarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 650 yards, in the East Highlands.

Range of mean annual temperature 51—40.

Native. Sylvestral. Very frequent in the agrarian region; becoming scarce above 400 or 500 yards. Being omitted from the Flora of Shetland, the county census is accordingly brought one step under the highest number; those isles being reckoned as one county.

302. VICIA BITHYNICA, *Linn.*

Area 1 2 3 * 5 6 7 * * 10 (11).
South limit in Devon, Hants, Kent.
North limit in Flintshire and Yorkshire?
Estimate of provinces
Latitude

England.

temperature 52—48.

Rupestral, &c. Although recorded from few localities only, the situations of growth are so variously described that it is uncertain which of the series of terms express the usual haunts of this species. Having on the cliffs of the coast, and finding d for it by some other botanists, pted, although not very charac- row in the counties of Devon, Sussex (now extinct?), Kent, Essex, Glou cester, Glamorgan, Denbigh, Flint and York; the two latter resting on old authority, the confirmation of which would be desirable.

pared to unravel. I have never been able to satisfy myself as to the existence of more than *two* species; each of them varying into a small form (minus or microphyllum). Still, there is very high authority in support of *three* distinct species. I would refer, for instance, to remarks by the Rev. G. E. Smith, in his Catalogue of the Plants of South-Kent; as also to those of Mr. Wilson, in the Phytologist, i. 293.

283. LOTUS CORNICULATUS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Sutherland, Hebrides.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 950 yards, in the East Highlands.
Range of mean annual temperature 52—38.
Native. Pascual. A most abundant species, and yet not perfectly general, even in a county estimate; for it would seem to be wholly absent from Shetland. Is this absence only an omission in Mr. Edmondston's Flora, or is it real? Seen in many spots on the hills up to 700 or 800 yards; rarely higher.

283,b. LOTUS TENUIS, *W. et K.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 * 14 15.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Forfarshire and Cumberland.
Estimate of provinces 15. Estimate of counties 60.

Latitude 50—57. British (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Pascual. Grows in more wet and stiff soils than L. corniculatus is usually found in; but the majority of botanists hold it merely a variety of the latter. Though I may confess a decided leaning towards the same opinion, the difficulty of converting a plant of tenuis into corniculatus opposes a counter argument or fact against that view. Hitherto, I have failed to change the one into the other, under garden culture, after planting the roots in dry ground, and raising the form or species afresh from seeds, two or three times. Being often passed by as a variety of L. corniculatus, the area and ranges of this species (if such it be) may be here too low set down and contracted.

284. LOTUS MAJOR, *Scop.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Aberdeenshire and Argyleshire.
Estimate of provinces 16. Estimate of counties 70.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 yards, in the East Highlands.
Range of mean annual temperature 52—46.

Native. Pratal and Sylvestral. Much more contracted in its area and ranges than L. corniculatus, of which it was formerly deemed a large variety; and, indeed, I have seen specimens to which it was difficult to apply either

name with confidence, owing to their intermediate size and characters. Enters but little within the superagrarian zone; though several localities may be held just within that zone; as, for example, the banks of Loch Earn, of Loch Lomond and Loch Fyne, the neighbourhood of Callander, and the glens of the Ochill hills.

285. LOTUS ANGUSTISSIMUS, *Linn.*

Area 1 [2 3 * 5 * * 8 * * * * * 14].
South and North limits in Cornwall and Devon.
Estimate of provinces 1. Estimate of counties 2.
Latitude 50—51. Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, probably, not above the coast level.
Range of mean annual temperature about 52.
Native. Glareal. Very local; but has been reported from various provinces, through the mistake of applying the name or synonymes of the present species to examples of L. tenuis. All the English specimens which I have seen belong to L. hispidus, not to the present species, if we consider the two distinct.

285,b. LOTUS HISPIDUS, *Desf.*

Area 1.
South and North limits in Cornwall and Devon.
Estimate of provinces 1. Estimate of counties 2.
Latitude 50—51. Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, probably, not above the coast level.
Range of mean annual temperature 52.

Native. Glareal. Very local; occurring in different spots near the Land's End and the Lizard Lights, in Cornwall, and at Dartmouth, in Devon. By the road-side between Penzance and the Land's End, where I first discovered this species, it grew in rather damp ground, and the plants were much finer than those observed on a dry bank in the Lizard. This latter locality is within the fiftieth degree of latitude, as explained on page 60.

286. ASTRAGALUS GLYCYPHYLLUS, *Linn.*

Area 1 2 3 4 5 * 7 8 * 10 11 12 13 14 15 * 17.
South limit in (Devon ?), Dorset, Isle of Wight, Kent.
North limit in Ross-shire, Moray, Aberdeenshire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—58. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel or Thames.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Sylvestral; &c. In fields, banks, borders of woods, &c. An intermediate link between the British and Germanic types; being rather too infrequent, and too eastern in its prevalence, to be very properly assigned to the British type. Possibly the estimate of 50 counties may be too high; but it appears to be known in about 40 already, and may occur in some others.

287. ASTRAGALUS HYPOGLOTTIS, *Linn.*

Area * [2] 3 4 5 * * 8 * 10 11 [12] * 14 15 * 17.
South limit in Herts, Oxfordshire, Worcestershire.

North limit in Ross-shire, Moray, Aberdeenshire.
Estimate of provinces 9. Estimate of counties 25.
Latitude 51—58. Germanic type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in Tyne province.
Ascends to 100 or 200 yards, in Scotland.
Range of mean annual temperature 48—46.

Native. Pascual, &c. Peculiar in its distribution; as apparently shunning the more southern counties, as well as the western and most northern. It is less prevalent in the south-east of England, and more prevalent in the east of Scotland, than other species assigned to the Germanic type; and yet it comes nearer to that than to any other type of distribution. It is included in the list of Poole plants, and has been recorded from Carisbrook, in the Isle of Wight; but both of these (if not the same intended locality) are probably erroneous; as also that of the Forest, near Woodford bridge, in Essex.

288. ASTRAGALUS ALPINUS, *Linn.*

Area * * * * * * * * * * * * * * * 15.
South limit in Forfarshire.
North limit in Aberdeenshire.
Estimate of provinces 1. Estimate of counties 2.
Latitude 56—58. Highland type of distribution.
Arctic region. Midarctic zone.
Descends to about 800 yards, in Aberdeenshire.
Ascends to about 900 yards, in Forfarshire.
Range of mean annual temperature 38—37.

Native. Rupestral. Very local; occurring on rocks in Glen Dole, Forfarshire, in small quantity; more plentifully on a hill or moor, called Little Craigandall, in Aber-

deenshire. Dr. Dickie finds the latter locality to be tween 2400 and 2500 feet above the sea, and the former is estimated somewhere between 2500 and 3000 feet. The more productive locality is within a deer forest, where sheep are not permitted to feed; and the rocks of Glen Dole are nearly or quite inaccessible to sheep. To these circumstances, it may be conjectured, the preservation of the species is to be attributed. Sheep and the dealers in specimens are fast destroying the scarcer alpine species.

289. ASTRAGALUS URALENSIS, *Linn.*

Area * * * * * * * * * * * * 13 * 15 16 17.
South limit in Wigtonshire and Fifeshire.
North limit in Sutherlandshire.
Estimate of provinces 4. Estimate of counties 6.
Latitude 54—59. Scottish type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends to the coast level, or nearly so, in W. Lowlands.
Ascends to ——?
Range of mean annual temperature 48—45.

Native. Pascual. A local species, but its localities so wide apart as to give it a large area in proportion to its scarcity. Recorded for the counties of Wigton, Fife, Forfar, Argyle, Ross and Sutherland. One of its localities may have considerable elevation; namely, that given in the Flora Scotica, "upon Cairn-dearg, one of the lower heads of Ben Sguilert, a high mountain of Glen Creran, in Upper Lorn." Possibly the range of mean temperature might be extended one or two degrees lower.

290. ASTRAGALUS CAMPESTRIS, *Linn.*

Area * * * * * * * * * * * * * * * 15.
South and North limits in Forfarshire.
Estimate of provinces 1. Estimate of counties 1.
Latitude 56—57. Highland type of distribution.
Arctic region. Inferarctic zone.
Descends and Ascends to about 700 yards.
Range of mean annual temperature 41 or 40.

Native. Rupestral. Extremely local; being found only on one spot, among the mountains in the north of Forfarshire. Although thus restricted, there is a difficulty in saying to which of the zones this species belongs; since Saxifraga nivalis has been observed rather lower, and Corylus Avellana almost equally high as this Astragalus, on the same range of rocks; yet the inferarctic zone should be interposed between the zones of the Corylus and Saxifraga, as is the case in every other place wherein I have seen them. See the remarks on this high locality for the Corylus, in the present volume, page 42.

291. ORNITHOPUS PERPUSILLUS, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray and Dumbartonshire.
Estimate of provinces 16. Estimate of counties 70.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 yards, in the East Highlands.

Range of mean annual temperature 51—46.

Native. Glareal. Either frequently overlooked or not a very common plant. As it is stated to occur about Newtyle and Comrie, I have assigned an altitude of 100 yards, and the temperature of 46 to the species; but these localities barely bring it within the superagrarian zone, even in connexion with that of Urquhart, in Moray. Apparently quite a scarce plant in Scotland, although said to be frequent about Glasgow.

292. ARTHROLOBIUM EBRACTEATUM, *De C.*

Area 1

South and North limit in the Scilly Isles.

Estimate of provinces 1. Estimate of counties 1.

Latitude 49—50. Atlantic or Local type of distribution.

Agrarian region. Inferagrarian zone.

Descends to the coast level.

Ascends, probably, little above the sea level.

Range of mean annual temperature 53 or 52.

Native. Glareal? Scarcely a British species; being known only in the Scilly Isles, near the coast of Cornwall, and in the Channel Isles, off the coast of France. The former habitat, however, may be considered to bring it within the limits for this work.

293. HIPPOCREPIS COMOSA, *Linn.*

Area 1 2 3 4 5 6 7 8 * 10 * 12 [13].

South limit in Devon, Isle of Wight, Kent.

North limit in [Aryshire?], Westmorland, Yorkshire.

Estimate of provinces 10. Estimate of counties 25.

303. VICIA HIRSUTA, *Koch.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Caithness and the Orkney Isles.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 250 or 300 yards, in the East Highlands.
Range of mean annual temperature 51—44.

Native. Septal, &c. Having seen this species so far north as the county of Caithness, I have ventured to rely on the authority of Lowe's list, for its occurrence also in Orkney, notwithstanding its absence from the lists of Shetland and Hebridean plants. Probably rare in the North Highlands; as it is not marked in the lists of species observed in Ross and Sutherland. The Rev. G. Gordon indicates it to be frequent in Moray; and Dr. Dickie says not unfrequent about Aberdeen. I observed it about Killin and Clova, and not elsewhere in the Highland valleys, above 100 yards of altitude.

304. VICIA TETRASPERMA, *Koch.*
304,b. VICIA GRACILIS, *Lois.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 * 15 * * [18].
South limit in Devon, Isle of Wight, Kent.
North limit in Forfarshire and Lanarkshire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—57. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Septal, &c. Like the preceding species, this one is found in corn-fields and meadows, as well as in hedge-rows and bushy places. It is much the less common of the two, though still frequent enough in the more southern provinces. In Scotland, I am not aware of its occurrence in any other counties than those of Kirkcudbright, Lanark, Fife and Forfar. To Fifeshire, it is supposed to have been introduced through ship's ballast; but it would seem to be native on the coast of Forfarshire, from the report of its locality by Dr. Macnab or Dr. Graham, namely, "among debris, in a very rocky bay, between Auchmithie and Seaton House, about half-way between Red Head and Arbroath, very abundant." (Excurs.) Besides these counties, it is recorded as an Orkney species, in Lowe's list. Hooker and Babington alike describe V. gracilis as a distinct species; while Henslow places it as a variety in the 'Catalogue of British Plants;' as it is also placed in the 'London Catalogue.' Though myself inclining to concur with Professor Henslow's view, I would have described the distribution of V. gracilis apart from that of V. tetrasperma, had I been in possession of the necessary data. All I am able to say, is, that botanists report V. gracilis from the first four southern provinces; namely, 1, 2, 3, 4.

305. LATHYRUS APHACA, *Linn.*

Area 1 2 3 4 5 * * (8 * 10 11 * * 14).
South limit in Devon, Dorset, Sussex, Kent.

North limit in Norfolk, Warwickshire, Worcestershire.
Estimate of provinces 5. Estimate of counties 20.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—48.

Native. Agrestal, &c. A scarce plant, and rather a colonist than a native in corn-fields; but as it occurs also in gravel-pits, and about hedges and road-sides, it may pass muster with the natives.

306. LATHYRUS NISSOLIA, *Linn.*

Area 1 2 3 4 5 * * 8 * [10 11 * * 14].
South limit in Devon, Isle of Wight, Kent.
North limit in Derbyshire, Norfolk, Herefordshire.
Estimate of provinces 6. Estimate of counties 30.
Latitude 50—54. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—48.

Native. Pascual, &c. As far north as Breaston, in the south of Derbyshire, whence I have a specimen, from Dr. Howitt, collected by Mr. Davidson. Recorded in the Botanist's Guide, as found by Mrs. Wharton, near Sigglesthorne, on the east coast of Yorkshire. We are told that "this plant grew between the Glass houses and Dent's Hole, Newcastle," in the time of Lawson. Mr. Embleton intimates to me that it has occurred (to whom?) near Leitholm, in Berwickshire. I hesitate to give the northern range beyond Derbyshire, until confirmed.

307. LATHYRUS HIRSUTUS, *Linn.*

Area 1 * 3 * * * * [8 * 10 11].
South and North limits in Somerset and Essex.
Estimate of provinces 2. Estimate of counties 2.
Latitude 51—52. Local or English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in province of Thames.
Ascends ——? Say, to 50 yards in the Peninsula.
Range of mean annual temperature 50—49.

Native? Agrestal? Very local; occurring between Bath and Bristol (Swayne, T. B. Flower) and in some few spots in Essex (C. C. Babington, &c.). Mr. Coke reported it from South Normanton, in Derbyshire. In the Flora of Yorkshire, it is said to grow "in cultivated fields near Elvington;" but without any personal authority being quoted. Stated, also, to have been formerly found on ballast hills, in the province of Tyne. These three latter localities and counties require confirmation. In "cultivated fields." *Brit. Flora.*

308. LATHYRUS PRATENSIS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 yards, in the East Highlands.

Range of mean annual temperature 52—43.

Native. Pratal and Septal. The only species of its genus which can be considered frequent in Britain; and one of the few plants which have the designation of "common" through the whole length of the island, even into Shetland.

309. LATHYRUS PALUSTRIS, *Linn.*

Area 1 [2 3] 4 * * 7 8 [9] 10 * * [13].

South limit in Somerset (Hants and Surrey?)

North limit in Yorkshire, Caernarvonshire (or Lancashire?)

Estimate of provinces 6. Estimate of counties 12.

Latitude 51—54. Local or English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 50 or 100 yards, in England.

Range of mean annual temperature 50—48.

Native. Paludal. The published localities for this species are to be received with distrust; as there can scarcely remain a doubt that some other plant has been occasionally mistaken for the present. In other instances, it may have been extirpated from recorded localities, through drainage or other farming operations. I have seen specimens from Suffolk (Mr. Woodward), Caernarvonshire (Dr. Howitt) and Yorkshire (Mr. Tatham). In two other provinces, those of the Peninsula (Rev. J. C. Collins) and Trent (Sir Joseph Banks), the authority appears sufficient. But there are still four provinces reported, which I hesitate to adopt until confirmed by additional observers. Mr. Notcutt records it as found at Botany Bay, near Southampton; the only authority for the Channel province which I find among my notes. Old authorities have indicated some of

the Thames counties, which appear to be simply repeated by modern authors, without confirmation afresh. Hudson says that it is frequent in Lancashire; where, however, I am unaware that it has occurred to any now living botanist. To these English provinces and counties, that of "Galloway," or the West Lowlands, is added in the British Flora, editions 4 and 5, without any personal authority given for the locality. Lightfoot had previously included it in the Flora Scotica, but without specifying any habitat. It seems likely enough that the species will occur in some of these provinces.

310. LATHYRUS SYLVESTRIS, *Linn.*

Area 1 2 3 4 5 6 7 8 * 10 * 12 13 14 [15 16].
South limit in Devon, Isle of Wight, Kent.
North limit in Berwickshire and Kirkcudbrightshire.
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—48.

Native. Sylvestral and Rupestral. Numerous localities are reported for this species in England, where it grows on the cliffs of the coast, as well as on banks and in bushy places inland. The Scottish localities are something suspicious as native habitats. Professor Balfour sends me specimens from Kirkcudbrightshire; and Mr. Embleton, also, from the banks of the White Adder, near Berwick on Tweed. How far these localities are truly native habitats, I am not prepared to say. The "debris of Salisbury Craigs," near Edinburgh (where I found only L. latifolius),

is not to be received as a true locality for a showy species not elsewhere found in the same neighbourhood. The locality indicated for this plant, in Don's account of the botany of Forfarshire, should be confirmed, before we can carry the area so far northward. It is curious that Mr. Don should give the "Red Head Promontory" for this plant, while Dr. Macnab gives it for Vicia tetrasperma; neither of these botanists, apparently, having noticed both of these plants there: could one have been mistaken for the other of them, by either botanist? In the New Guide, the locality of "Bennan Head, in the Isle of Arran," is recorded for Lathyrus sylvestris, on the authority of the British Flora; but I do not find such a locality given in the two last editions of that Flora. Perhaps the county census of 40 may be rather too high, though that of 30 might be as much too low.

LATHYRUS LATIFOLIUS, *Linn.*

Area (1 2 3 4 5 * 7 * * [10 * 12] 13 14 15).

Alien. Being a plant which seeds well, and retains hold of the ground by creeping suckers, this species has become established to some degree in quarries and neglected spots. Besides these naturalized habitats, there are probably several which are totally erroneous, through the mistaking of L. sylvestris for the present species; as is known to have been the case with the plants found near Whitehaven and Scarborough, which belonged to L. sylvestris. Some, if not all, of the localities near Bristol and Bath also belong to the latter.

311. LATHYRUS MARITIMUS, *Big.*

Area [1] 2 3 4 * * * 8 * * * * * * * * * 18.
South limit in Dorset, Sussex, Kent.
North limit in Shetland and Orkney.
Estimate of provinces 5. Estimate of counties 5.
Latitude 50—61. Local type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the south coast of England.
Ascends, on the coast level, to Shetland.
Range of mean annual temperature 51—47.

Native. Littoral. Local and peculiar in its distribution; occurring on the coasts of Dorset, Sussex, Kent, Suffolk and Shetland. Those of Lincoln and Orkney are reported on old and unsupported authority; but neither of them appears any-wise an improbable habitat. The beach near Penzance, in Cornwall, and that of Sandown, in the Isle of Wight, are also on record; and though these places are likely enough, the plant is no longer found there. Apart from the localities of Orkney and Shetland, the distribution would have appeared that of the Germanic type, that is, looking solely to England.

312. OROBUS TUBEROSUS, *Linn.*
312,b. OROBUS TENUIFOLIUS, *Roth.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Sutherland.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 700 yards, in the East Highlands.

Range of mean annual temperature 51—40.

Native. Sylvestral. Omitted from the Floras of Yarmouth and Cambridge, and from several local lists of a less complete character; as also from the Catalogue of plants observed in the Hebrides, by Balfour and Babington. It may happen that the census would be more true at 75 than at 80; but I cannot select half a dozen counties, from which this plant appears likely to be quite absent. Variations in the breadth of the leaves are so frequent with many other allied leguminous plants, that the O. tenuifolius appears scarce worth distinction as a named variety, and much less as a species.

313. OROBUS NIGER, *L.*

Area * * * * [5] * * * * * * * * * 15.

South and North limits in Perthshire and Forfarshire.

Estimate of provinces 1. Estimate of counties 2.

Latitude 56—57. Local or Scottish type of distribution.

Agrarian region. Superagrarian zone.

Descends——? Ascends——? (Say, 100—200 yards).

Range of mean annual temperature (45?)

Native? Sylvestral. Discovered by Mr. Thomas Drummond, in the Den of Airly, twelve miles westward of Forfar, near or within the county of Perth; and more lately seen by Mr. Gorrie, "in the Pass of Killicrankie, scattered over a piece of ground in the coppice wood, at least twenty yards across, and far removed from any cultivated ground." (Trans. Bot. Soc. Edinb.) The very circumscribed area of the locality seems the only circumstance of suspicion against the nativity of the species in Scotland. More

distant habitats have been recorded, in Moray; but there probably O. tuberosus was mistaken for O. niger. There can be no doubt that the same error caused the introduction of the latter name into Mr. Carter's list of plants seen about Cheadle, in Staffordshire; and I think that the same mistake has caused O. niger to be reported from other provinces, also, though I have not kept notes of these errors, and therefore cannot here indicate the provinces. It may be as well, while alluding to an example in point, to explain that the provinces within which I find species erroneously recorded, or suppose them to be recorded erroneously, are indicated by their *nos.* in the line of area, in order to put other botanists upon their guard against being misled by these false habitats; which have frequently occasioned much trouble and uncertainty to myself, in investigating the distribution of species. At the same time, it is to be borne in recollection that the enclosed *nos.* are not known to be errors in every instance: some of them may turn out to be quite correct.

314. PRUNUS SPINOSA, *Linn.*
314,b. PRUNUS INSITITIA, *Linn.*
314,c. PRUNUS DOMESTICA, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit (of P. spinosa) in Sutherland.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 200 or 300 yards, in England.
Range of mean annual temperature 51—46.

Native. Septal, &c. Prunus spinosa is a frequent shrub in old hedge-rows and on the common wastes of England; and is probably to be found in every county except the North Isles. It is omitted, however, from Mr. Gutch's list of Swansea plants; though a shrub which is so frequent in the Peninsula and North Wales cannot be supposed absent from South Wales. P. insititia is much less common, though still pretty frequent. But P. domestica seems only to occur as a descendant of the varieties in cultivation. The truly wild forms appear to pass into each other so gradually and completely, that distinctive characters cannot be applied to them. Dr. Bromfield writes of P. domestica—"By this name I call the largest of a series of inseparably linked forms, ascending from the common sloe."

315. PRUNUS PADUS, *Linn.*

Area (1 2) 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Glamorgan & Surrey (or Cornwall & Kent?).
North limit in Sutherland, Aberdeenshire, Argyleshire.
Estimate of provinces 15. Estimate of counties 50.
Latitude 51—59. British (or Scottish) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends nearly or quite to the coast level, in England.
Ascends to 350 yards (rarely), in the East Highlands.
Range of mean annual temperature 49—43.

Native. Sylvestral. Rather sparsely distributed over Britain, and absent or doubtfully indigenous towards the extremities of the island. The Rev. T. P. Jones records it as observed near Bodmin, in Cornwall; it is also included in the Flora Tonbridgensis, by Forster, and retained in that by Jenner, on Forster's authority only. Dr. Bromfield

marks it as an introduced species in the Isle of Wight. As it is absent from the more numerous other lists, which record the plants of the two first provinces, I have hesitated to receive it for a genuine native. By Dr. Graham it was observed so far north as Sutherland, and it is marked in the Catalogue checked for Ross, by the Rev. G. Gordon. Well-grown trees occur by the river at Castletown of Braemar, which will exceed 300, if not 350 yards of elevation.

316. PRUNUS CERASUS, *Linn.*
CERASUS AUSTERA, *Leight.*

Area 1 2 3 * 5 * 7 8 9 * * 12.
South limit in Cornwall, Isle of Wight, Sussex.
North limit in Cumberland and ———?
Estimate of provinces — ? Estimate of counties — ?
Latitude 50—55. English (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends nearly or quite to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Septal. As the fruticose Cherry is usually distinguished with facility from the arborescent one; and as many good British botanists hold the two to be specifically distinct, it has appeared better to show their distribution apart, so far as present information will go. The localities in the counties of Cornwall, Devon, Dorset, Hants (Isle of Wight), Sussex, Surrey, Salop, Denbigh, Leicester, Chester and Cumberland, are all those at present known to me, either as an eye-witness, or as relying upon the eyes of others; but there appear good reasons for supposing that it will be ascertained in many other counties, by those botanists who may look for it, apart from Prunus avium.

316,b. PRUNUS AVIUM, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Aberdeenshire, Perthshire, Argyleshire.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 150 yards, in the East Highlands.
Range of mean annual temperature 51—46.

Denizen. Sylvestral and Septal. As belonging to this species, I take all the habitats published for "P. Cerasus," excepting those which are accompanied by some intimation that the authors intended to apply that name to the Cerasus austera of Leighton. For ample details on their differences, I would refer to the Flora of Shropshire, pp. 523 to 527. The Rev. G. Gordon considers this to be certainly introduced into Moray. Dr. Dickie records it about the river Don, in Aberdeenshire, on the authority of Mr. A. Fleming. Fine trees of it occur at Killin, in Perthshire; whether planted I cannot say. Professor Balfour marks the name (but which species is intended?) in a list of plants checked for Islay, at the southern extremity of the West Highland province. In England, P. avium is of frequent occurrence; but I entertain considerable suspicion that in many instances (if not, aboriginally in all) these wild trees owe their existence to seeds disseminated by birds which resort to the Cherry-trees in gardens. Jays, thrushes and blackbirds swallow the fruit whole, and disgorge the "stones" after a short period; during which they may often resort again to the fields and groves, and may thus sow the seeds.

Analogy suggests a question, whether the true and only original stock of the arborescent Cherries, of the gardens and of the wilds, is not really the fruticose P. Cerasus? There is a very austere and fruticose wild Sloe (P. spinosa) which is almost admitted to be the origin of all the Plums (P. insititia and P. domestica). And there is a very austere and fruticose wild Crab, with small round fruit, which appears to be the genuine stock of the arborescent Apples of the gardens, and of all those intermediates which are now found in our hedges and copses; some, as deteriorating varieties, immediately derived from the garden trees; some, probably, as improving varieties, originating from the true wild stock. At any rate, some of the garden Cherry-trees have botanical characters intermediate between those assigned, by authors on Botany, to P. Cerasus and to P. avium, respectively.

317. SPIRÆA ULMARIA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 850 or 900 yards, in the East Highlands.
Range of mean annual temperature 51—38.

Native. Pratal and Paludal. A common or frequent plant throughout Britain; ascending to the rocks of Canlochen Glen, and probably to 800 yards on the mountains by Loch Erricht, at the head of Moray.

318. SPIRÆA FILIPENDULA, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 (13) 14 15 * (17).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Forfarshire (Lanarkshire or Cumberland?)
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—57. English (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Pascual or Glareal. Found so far north as the county of Ross; but there the Rev. George Gordon questions its being truly an indigenous plant. The locality given in the Flora of Lanarkshire, "at the bottom of the wall called Lover's Leap, at Chatelherault," reads rather suspiciously, when taken in connexion with the absence of the species from the Flora Glottiana. Rather frequent in England, on dry and chalky or other calcareous ground. The locality for the Lake province, standing on the authority of Hutchinson, is allowed to pass, but should be confirmed before full trust can be given to it.

319. SPIRÆA SALICIFOLIA, *Linn.*

Area (* * 3 * 5 6 7 * * 10 11 12 13 14 15 16 17).

Alien. It is to be feared that there was no good reason for including this shrub in our lists of indigenous plants. It is frequently introduced in plantations, as an ornamental shrub for under-growth; and keeping well hold of the ground by its suckers, it remains and spreads in places

where planted. The few spots in which I have chanced to see it were too obviously of artificial origin to leave any doubt in my own mind; but there are or have been botanists who hold it truly a native of this country.

320. DRYAS OCTOPETALA, *Linn.*
320,b. DRYAS DEPRESSA, *Bab.*

Area * * * * * * * * * 10 [11 * 13] * 15 16 17 18.
South limit in Yorkshire.
North limit in Orkney and Sutherland.
Estimate of provinces 5. Estimate of counties 9.
Latitude 54—60. Highland type of distribution.
A. A. regions. Superagrarian—Midarctic zones.
Descends to the coast level, in the North Highlands.
Ascends to 900 yards, in the East Highlands.
Range of mean annual temperature 46—38.

Native. Rupestral. Occurs sparingly in Orkney, according to the Rev. C. Clouston, in New Guide. In some parts of Sutherland it is abundant as daisies are around London. Localities occur in several of the Highland counties, and also in Yorkshire; always or mostly on limestone formations. There is an idea with some botanists, that the attachment of certain species of plants to limestones or other peculiar rocks, is attributable to a higher temperature or drier nature; the effect of which, on the plants, being nearly equivalent to that of a warmer clime. Against this view the Dryas seems an opposing fact; since, with us, it descends lower upon the limestones, both in respect of elevation and latitude, than we should otherwise have expected to find this arctic plant. Mr. C. C. Babington conjectured that he had discovered a second species in Ireland, and described it as such even without waiting to

know so much of the plant as the colour of its flowers. Mr. Andrews, to whom I applied for information thereon, writes thus: "I examined particularly on Ben Bulben, for Dryas depressa, and also in Clare. I was looking them over last night, with reference to Mr. Babington's remarks in the tenth volume of the Annals, and I really am puzzled as to the grounds of distinction which he has drawn." It is to be feared that the 'Dryas depressa' will only descend and be known as a name in books, without anything constant in nature to answer to the name.

321. GEUM URBANUM, *Linn.*

321,b. GEUM INTERMEDIUM, *Ehrh.?*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ross-shire, Aberdeenshire, Argyleshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 150 yards, in the East Highlands.
Range of mean annual temperature 52—47.

Native. Septal and Sylvestral. Abundantly distributed through England; apparently becoming scarce towards the Highland provinces and northern coasts of Scotland. It is marked "frequent" in the Floras of Aberdeen and Moray; but occurs not in my lists of plants observed in the higher valleys of the Grampians, nor in those for the north of Caithness and Sutherland; while from the North Isles it would seem to be quite absent.

322. GEUM RIVALE, *Linn.*
322,b. GEUM HYBRIDUM, *Jacq.?*

Area, general.
South limit in Devon, Hampshire, Sussex.
North limit in Orkney and West Inverness-shire.
Estimate of provinces 18. Estimate of counties 70.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Channel province.
Ascends to 900 or 950 yards, in the East Highlands.
Range of mean annual temperature 50—37.

Native. Sylvestral, Septal, &c. The distribution of this species is nearly the opposite of that of G. urbanum; being a boreal plant which becomes scarce in the south of England. In the Hampshire marshes, scarcely above the level of the tides, it is almost a 'paludal;' while on the mountains of Scotland, it becomes rupestral or ericetal and uliginal. For the most part, however, shaded spots appear those which are congenial. Although the area of this species is somewhat wider, yet Geum urbanum is the commoner one, if we except the Highlands, and, perhaps, some other mountainous tracts. As for G. intermedium, it is truly difficult to say whether it would be better to regard this abnormal form as a variety of rivale or of urbanum; some examples approximating to the one, some to the other. My own idea is, that both species may sport into varieties; the varieties of the one greatly resembling those of the other species. At any rate, the intermediate examples are not one form, but a series of forms; the extremes of which differ from each other more than they differ, respectively, from the two species, into which they appa-

rently pass at the two ends of the series. These intermediates are recorded from various counties; southwards to Norfolk, northwards to Forfarshire.

323. AGRIMONIA EUPATORIA, *Linn.*
† AGRIMONIA ODORATA, "*Ait.*"

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray, Kincardineshire, Argyleshire.
Estimate of provinces 16. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Pascual and Viatical. A frequent plant in England; but becoming so much rarer beyond the Clyde and Forth, as almost to justify a reference to the English, rather than to the British type. In the Flora Abredonensis only one locality is mentioned, which is within the county of Kincardine; two being indicated also in the Collectanea for Moray. Frequent about Edinburgh, according to the Society's Catalogue. A. odorata has occurred in the Channel Isles.

324. SIBBALDIA PROCUMBENS, *Linn.*

Area * * * * * * * * * * * * [13] * 15 16 17 18.
South limit in Argyleshire, Dumbartonshire, Stirlingshire.
North limit in Shetland and Sutherland.

Estimate of provinces 4. Estimate of counties 12.
Latitude 56—61. Highland type of distribution.
Arctic region. Inferarctic—Superarctic zones.
Descends to 500 yards, in the East Highlands.
Ascends to 1400 yards, in the same province (G. Dickie).
Range of mean annual temperature 41—33.

Native. Rupestral and Pascual. Frequent on the Highland mountains; and constituting, in some places, a considerable portion of the green sward; like the Bellis or Prunella in our dry pastures of England. In Shetland, it must be below 500 yards. It is worthy of note, that this plant, which can flourish below 600 yards, on the Grampian mountains, should not occur at all on those of Wales or England. It is, however, only among lofty hills that the plant grows at its lower elevations, with the exception of Shetland, where the summer temperature is doubtless low, with reference to the mean of the year, which is made so high as 48° of Fahrenheit, by recent observations taken hourly.

325. POTENTILLA FRUTICOSA, *Linn.*

Area * * * * * * * * * 10 11 12 (13).
South limit in Yorkshire.
North limit in Durham and Cumberland.
Estimate of provinces 3. Estimate of counties 3.
Latitude 54—55. Local type of distribution.
A. A. regions. Superagrarian—Inferarctic zones.
Descends —— ?
Ascends —— ?
Range of mean annual temperature — ?

Native. Rupestral. Three English habitats are given for this rare species; namely, Wastdale Screes, in Cum-

berland; the course of the Tees, both on the Yorkshire and on the Durham sides of the river; and by the river Don, in the limestone tract westward of Doncaster. In the Scottish locality, the Falls of Clyde, it has probably been planted. Wastdale Screes may perhaps be considered within the inferarctic zone; but some of the places in which it is found, by the Tees, must be within the superagrarian zone; and possibly others even so low as the midagrarian, especially should the banks of Don, near Doncaster, prove a true locality. I am unprepared to make any very satisfactory estimate of the altitude and temperature.

326. POTENTILLA RUPESTRIS, *Linn.*

Area * * * * * * 7.
South and North limits in Montgomeryshire.
Estimate of provinces 1. Estimate of counties 1.
Latitude 52—53. English type of distribution.
Agrarian region. Midagrarian zone?
Descends, and Ascends, to 150—250 yards.
Range of mean annual temperature, say 47—46.

Native. Rupestral. Not having seen the locality of this plant, which is apparently limited to one hill in Wales, I am obliged to enter the range of altitude and temperature by an estimate founded on information given to me by the late J. E. Bowman, to the following effect: "This very local plant is distributed, sometimes in groups very profusely, on the western face of the Breidden Hill; occupying the middle zone, disappearing at 600 or 700 feet, and not descending near the base. It occurs again on the very steep northern side, where it comes lower down. Yet it grows very well, and is produced from seed, in a warm garden." Even in Surrey, also, in very dry and loose

ground, it flourishes well, and diffuses itself freely by self-sown seeds.

327. POTENTILLA ANSERINA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 yards, in the East Highlands.
Range of mean annual temperature 52—43.
Native. Viatical and Glareal. A common plant over most part of Britain; the mountains and their more elevated or humid valleys excepted.

328. POTENTILLA ARGENTEA, *Linn.*

Area 1 2 3 4 5 * 7 8 * 10 11 12 13 14 15 * * [18].
South limit in Dorset, Hants, Sussex, Kent.
North limit in Moray, Forfarshire, Wigtonshire?
Estimate of provinces 14. Estimate of counties 40.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—47.
Native. Glareal. A sparsely distributed example of the British type; showing some tendency, also, towards the Germanic type. Included in their lists of Orkney plants,

by Lowe and Clouston; yet scarcely admissable as a species indigenous in those islands, until confirmed by other observers. The Lake province, also, requires corroboration by a better authority, although likely enough in itself.

329. POTENTILLA VERNA, *Linn.*

Area 1 * * 4 5 6 7 8 9 10 11 12 * 14 15.
South limit in Devonshire and Suffolk.
North limit in Forfarshire, Fifeshire, Cumberland.
Estimate of provinces 12. Estimate of counties 25.
Latitude 50—57. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends almost to the coast level, in the Peninsula.
Ascends to 200 or 250 yards, in the Lake province.
Range of mean annual temperature 50—46.

Native. Rupestral and Glareal. A thinly scattered species, the distribution of which is neither eastern nor western, northern nor southern, local nor mountain, to such a degree as to throw it into any one of the types of distribution, specially distinguished from the British type; and yet it is too local to come fairly under the last more general type. Mr. Lees finds it at about 1000 feet of elevation on the Malvern Hills. Though apparently restricted to the eastern provinces in Scotland, there is no such limitation to its area in England. I feel uncertain whether my Cumberland specimens should be referred to P. verna or to P. alpestris.

330. POTENTILLA ALPESTRIS, *Hal. fil.*
"POTENTILLA SALISBURGENSIS, *Jacq.*" (Br. Fl.)

Area * * * * * 6 * * * 10 11 12 * * 15.
South limit in Cardiganshire? Brecknockshire? Yorkshire.
North limit in Aberdeenshire, Perthshire, Westmoreland.
Estimate of provinces 5. Estimate of counties 10.
Latitude 52—57. Highland type of distribution.
A. A. regions. Superagrarian—Midarctic zones.
Descends to, say 300 or 200 yards, in Wales & Yorkshire.
Ascends to 850 or 900 yards, in the East Highlands.
Range of mean annual temperature 46—37.

Native. Rupestral. Probability, rather than certainty, induces me to include South Wales within the area and ranges of this species. On the authority of the English Flora, it grows in Cardiganshire. I have a specimen from the Botanical Society of London, which appears properly referrible to this species, although labelled "Tormentilla officinalis;" and which is located from "Glyn Neath, Breconshire," apparently in the hand-writing of Mr. Lees, whose name is given as that of the contributor of the specimen to the Society. The decidedly higher provincial census of this species in England, as compared with its limitation to a single Highland province, is an anomaly, of which a somewhat similar instance occurs in Thlaspi alpestre. It is probable, however, that the distribution of P. verna and P. alpestris should be taken as that of one species only; and in this case their anomalies would be much lessened, although not wholly removed.

POTENTILLA OPACA, *Linn.*

Area [15].

Incognit. "Hills of Clova, and Braes of Balquidder, Scotland: G. Don." Repeatedly as the hills of Clova have been searched by the best collecting botanists of Scotland and England, since the time of Don, this species has not again been found.

331. POTENTILLA REPTANS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Aberdeenshire, Perthshire, Argyleshire.

Estimate of provinces 16. Estimate of counties 70.

Latitude 50—58. British (?) type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 52—47.

Native. Septal and Viatical. An abundant species in England; decreasing so much in Scotland, as almost to warrant the assignment of it to the English type, notwithstanding its wide area and high census.

332. POTENTILLA TORMENTILLA, *Schk.*
332,b. POTENTILLA NEMORALIS, *Nest.*

Area, general.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Shetland, Orkney, Hebrides.

Estimate of provinces 18. Estimate of counties 82.

Latitude 50—61. British type of distribution.

A. A. regions. Inferagrarian—Superarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 1100 yards, or upwards, in East Highlands.

Range of mean annual temperature 52—36.

Native. Ericetal, Pascual, &c. One of the most generally distributed and abundant of British plants; and thus pre-eminently belonging to the British type of distribution. Potentilla nemoralis (Tormentilla reptans, *Linn.*) is quite one of our botanical opprobria. I have examined many examples in this country and in the Azores, and have had it in cultivation in my garden for some years past; and still I feel quite uncertain about it. For the present, my opinion remains much the same in respect to P. nemoralis, with that before expressed concerning Geum intermedium; namely, that varieties of two species (P. reptans and P. Tormentilla) are clubbed together to make up the P. nemoralis. But there is still a difficulty under this view, for some examples appear so precisely intermediate, that I know not whether to place them as varieties of P. reptans, or as varieties of P. Tormentilla. In one form or other, plants to which botanists would usually give the name of Potentilla nemoralis (or Tormentilla reptans) occur in almost or quite every province. But I suspect that it is more frequently represented by varieties of Potentilla reptans than by those of Potentilla Tormentilla.

333. POTENTILLA FRAGARIASTRUM, *Ehrh.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * 17.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Ross-shire, Aberdeenshire, Renfrewshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 700 yards, in North Wales.
Range of mean annual temperature 51—40.

Native. Sylvestral and Septal. Frequent or common in England; becoming infrequent or rare in the Highland provinces. This latter circumstance is rather remarkable, because the plant is seen occasionally at a high elevation. Even in Glen Beg, in the north of Perthshire, it was observed at 2000 feet of elevation; which, in a narrow mountain pass, is almost within the midarctic zone; and, indeed, the Sibbaldia and this Potentilla were growing at about the same elevation in the pass; though the Sibbaldia is rarely seen within the inferarctic zone, except where it descends along the course of a stream, which is not the case in the pass from Glen Beg to Glen Clunie.

POTENTILLA ALBA, *Linn.*

Area [7].

Incognit. Supposed to have been brought from Wales; but not having been verified as a native of that part of England, we seem to be warranted in presuming that P. Fragariastrum or some other plant was mistaken for this one.

POTENTILLA TRIDENTATA, *Linn.*

Area [15].

Incognit. The late Mr. G. Don appeared quite confident that he had seen or collected this species in Forfarshire; and there is even a specimen preserved in Smith's herbarium, which is labelled as though actually collected on the mountain of Werron, in that county, by Mr. Don, with the date of April 3, 1809. Is it possible that Mr. Don could have mistaken plants of Sibbaldia procumbens or Potentilla Fragariastrum for this species, and have sent or pointed out to Smith an example of P. tridentata as being the same species as that which he had seen on Werron and other hills? I do very much suspect that this is the true solution of some of the mystery or uncertainty which attaches to several of Mr. Don's habitats; namely, that, intending to send or show the same species, he or Smith inadvertently confused it with some other species.

334. POTENTILLA COMARUM, *Scop.*

Area, general.
South limit in Cornwall, Isle of Wight, Sussex.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 70.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 850 or 900 yards, in the East Highlands.
Range of mean annual temperature 50—38.
Native. Uliginal. Much less frequent than most other

species which are distributed so widely, and which also ascend so high; and it may be considered quite a rare plant in the south of England. Possibly, however, the county census might be carried up to 75.

335. FRAGARIA VESCA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Ross-shire.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 650 yards, in the East Highlands.
Range of mean annual temperature 51—40.

Native. Sylvestral. I have taken a license here, which is more freely allowed to poets than to scientific men; namely, in imagining a general area, without absolute proof by evidence. I do not find this common plant recorded as a native of South Wales; but its absence from that province appears so exceedingly unlikely, that I may be excused in taking the fact for granted or certified. Very rare above the agrarian region. Is the F. calycina or atrovirens (Lindl.) a variety of this species? Winch calls it "the wood strawberry in a luxuriant state."

336. FRAGARIA ELATIOR, *Ehrh.*

Area (* 2 3 * 5 * 7 8 * 10 11 * 13).

Alien. Opinions differ respecting the civil claims of this species. Hooker brands it with the alien's mark.

Babingtom marks it only as a suspected settler. Smith reports it "certainly wild" in Hertfordshire; but it would seem to be very local in that county, for the Authors of the 'Report' print the name in *italics* as that of a species which they have not met with, nor yet had sent to them by any other botanist. Mr. Babington says, "Woods in the south;" while the Flora of Yorkshire has it, "in Teesdale, frequent;" and Sir W. C. Trevelyan informs us that it is "not unfrequent about Wallington;" though rarely fruiting there. It would thus seem to have become wild both in the south and in the north of England, in low and in elevated places.

RUBUS ARCTICUS, *Linn.*

Area [10 * * * * 15 16].

Incognit. Supposed to have been formerly found in the Isle of Mull, and on Ben y Gloe, in Perthshire; but generally given up as a British species, until the Botanical Society of Edinburgh reported the discovery of it, "near the head of Glen Tilt, by Mr. J. Robertson, Gardener, Kinfauns." Subsequently it was again reported, that "the very imperfect state of the fragment of a specimen exhibited, left great doubt whether the discovery ought yet to be fully relied on." Several years ago, a specimen of the very plant, beyond all doubt, was sent to me as having been gathered on a moor in Yorkshire; but I could neither obtain nor hear of any second specimen, and felt no doubt respecting the origin of that one specimen from a botanic garden in another county.

337. RUBUS CHAMÆMORUS, *Linn.*

Area * * * * * * 7 8 9 10 11 12 13 14 15 16 17.
South limit in Merionethshire, Cheshire, Derbyshire.
North limit in Sutherland and Ross-shire.
Estimate of provinces 11. Estimate of counties 30.
Latitude 53—59. Highland type of distribution.
A. A. regions. Superagrarian—Superarctic zones.
Descends to about 200 yards, in the North Highlands.
Ascends to 1100 yards, in the East Highlands.
Range of mean annual temperature 43—36.

Native. Uliginal. Seldom so low as the agrarian region; but reported by Dr. Dickie, at 1000 feet in Aberdeenshire; and the name occurs in my note-book among those of plants seen between 350 and 970 feet in Sutherland. The locality of "Cleghorn and Boniton woods," in Lanarkshire, may be the lowest in respect of climate, if not in respect of absolute elevation also; and that locality might probably warrant an additional degree or two above the assigned temperature of 43. It is worthy of note that this arctic species should hitherto not have been observed in the North Isles.

338. RUBUS SAXATILIS, *Linn.*

Area [1] * * * 5 6 7 8 9 10 11 12 13 14 15 16 17 18.
South limit in Glamorgan, Gloucestershire, Derbyshire.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 14. Estimate of counties 40.
Latitude 51—61. Scottish type of distribution.
A. A. regions. Midagrarian—Midarctic zones.

Descends to the coast level, in Scotland or England.

Ascends to 900 yards, in the East Highlands.

Range of mean annual temperature 46—38.

Native. Sylvestral and Rupestral. Reported to grow near Bodmin, in Cornwall; and though the habitat is not very unlikely, I hesitate to adopt it for the basis of my estimates of range, &c. As Mr. Gutch includes this species in the list of plants growing about Swansea, in South Wales, it may be that the temperature of 46 is too low for the upper extremity of the range.

339. RUBUS CÆSIUS, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 * 14 [15].

South limit in Devon, Isle of Wight, Kent.

North limit in Berwickshire and Cumberland?

Estimate of provinces 14. Estimate of counties 40.

Latitude 50—56. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 51—47.

Native. Sylvestral, &c. Frequent in the south of England; decreasing northwards; rare in Scotland. I have seen specimens, which apparently belong to this species, from all the provinces above enumerated for it, excepting those of North Wales and the Lakes, which are given on the authority, respectively, of the late J. E. Bowman and N. J. Winch. I think that some botanist told me it grows near Glasgow; and a habitat in Moray is given on the authority of the Rev. G. Wilson. Not recognized as a species of the Edinburgh circuit, in the Catalogue of the Botanical Society, though previously recorded therefrom.

340—345. RUBUS FRUTICOSUS, *Linn.*
&c., &c., &c.

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Sutherland, Hebrides.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 250 or 300 yards, in the East Highlands.
Range of mean annual temperature 52—44.

Native. Sylvestral, &c. Without intending to maintain that all our fruticose Rubi, between cæsius and Idæus, are referrible to a single species, I am still under the necessity of treating their distribution in the aggregate. It is useless to compile or collate localities published in books or communicated to me in writing; because different botanists have applied the same names so variously, that any such course would result only in a compilation of errors and suppositions. If I look to the specimens in my own herbarium, I am almost as much at fault; being unable to fit the specific characters laid down by authors on the species to the particular specimens in my herbarium. And if I look to the labels of those which have been given to me ready-labelled by other botanists, I find their names crossed and applied in the most confusingly varied manner. On turning to the latest, and probably much the best account of the species, real and supposed, 'Babington's Synopsis of the British Rubi,' I find the account of their distribution confined to the mention of a few isolated localities, or the general expressions of "rare," "common,"

&c. From these materials, it is obviously impossible to carry out my own mode of illustrating the distribution of species, with the species of Rubi which have been gradually carved out of the Linnean "fruticosus" and its allied forms. If any botanist can and will do this, I shall be happy enough to incorporate his achievement in a subsequent volume of the present work.

346. RUBUS IDÆUS, *Linn.*

Area, general.
South limit in Devon, Isle of Wight, Kent.
North limit in Orkney and Sutherland.
Estimate of provinces 18. Estimate of counties 75.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 650 yards, in the East Highlands.
Range of mean annual temperature 50—40.

Native. Sylvestral, &c. Probably often dispersed by birds from the gardens into the hedges and copses; but apparently an indigenous production throughout Britain. Neither this one nor any other species is included among the plants of Shetland, by Edmondston, with the exception of R. saxatilis. Balfour and Babington did not meet with it in the Hebrides; but Dr. Neill observed it in Orkney.

347. ROSA SPINOSISSIMA, *Linn.*
ROSA RUBELLA, *Sm.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Caithness, Sutherland.
Estimate of provinces 18. Estimate of counties 60.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 650 yards, in the East Highlands (Dickie).
Range of mean annual temperature 52—40.

Native. Glareal and Ericetal. Although generally spread through Britain, when we test its distribution by provinces, it is apparently absent from so many counties, that the census of 70 would seem too high under existing knowledge; and, indeed, only 45 counties can yet be named for it on recorded authority, including my own manuscript notes therewith. I have not met with examples quite up to 600 yards, and therefore cite the highest limit from Dr. Dickie, who fixes it at 2000 feet. As far as British specimens are concerned, the "Rosa rubella" would seem to represent a variety of Rosa spinosissima, or to be simply a synonym of the latter.

348, 349. ROSA VILLOSA, *Linn.*
&c., &c., &c.

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.

Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 600 or 650 yards, in East Highlands.
Range of mean annual temperature 51—41.

Native. Sylvestral, &c. For reasons nearly similar to those mentioned under the head of 'Rubus fruticosus,' I find myself compelled to group a long series of forms (varieties or species) of Roses, which appear different enough while we contrast extremes; but which glide so gradually into each other, in their intermediates, that I am quite unable to distinguish the alleged species by published descriptions, or even to separate my own dried specimens into species in a satisfactory manner. Rare above the agrarian region.

350. ROSA RUBIGINOSA, *Linn.* &c., &c., &c.

Area 1 2 3 4 5 6 * 8 * 10 11 * 13 14 15 16.
South limit in Devon, Isle of Wight, Kent.
North limit in Aberdeenshire and Moray.
Estimate of provinces 16. Estimate of counties 50.
Latitude 50—58. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Septal, &c. Again I am compelled to give the distribution of a group of the Sweet-briar Roses, which many botanists name and describe as five or six species; and which, could this have been accomplished, I should

have willingly treated apart from one another. The Sweet-briars do not seem to be so generally distributed as the Dog-roses, either of the preceding or succeeding groups or species. Mr. Anderson considered "Rosa rubiginosa" undoubtedly wild on the banks of the Dee, in Aberdeenshire. By the Rev. G. Gordon it is held only dubiously indigenous in Moray.

351. ROSA CANINA, *Linn.* &c., &c., &c.

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Sutherland.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 450 yards, in the East Highlands.
Range of mean annual temperature 52—42.

Native. Septal, &c. There appears less likelihood that the various species which have been carved out of R. canina are truly distinct, than in the two preceding instances. But there is at least one form which I must confess much difficulty in connecting with R. canina, though the late Mr. David Don assured me confidently that it was the R. dumetorum (Woods), and one of the varieties of R. canina. The distribution, as above indicated, is independent of that particular variety. I give 81 as the county estimate, instead of 82, on account of Messrs. Balfour and Babington not recording R. canina from the Hebrides.

352. Rosa stylosa, *Desv.*

Area 1 2 3 * 5 6 * * * 10 * * ? * 15 16.
South limit in Somerset and Sussex.
North limit in Forfarshire and near Fort Augustus.
Estimate of provinces — ? Estimate of counties — ?
Latitude 50—58. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends, probably, to the coast level, in England.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 50—46.

Native. Septal, &c. This is a species which I do not well know, and much fear that it is in fact made up from several species or varieties, which, when their styles are distinct, pass under other names. I cannot decidedly assert the fact, but I have seen some grounds for supposing that the elongated and united styles are simply a deviation from the ordinary condition of the parts, which occurs occasionally both in canina and tomentosa; and if so, the Rosa systyla of English authors may be no more a real species than is the Bidens Coreopsis or the Linaria Peloria.

353. Rosa arvensis, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Renfrewshire and Haddingtonshire.
Estimate of provinces 14. Estimate of counties 60.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 51—47.

Native. Septal, &c. The estimate of 60 counties may possibly be too high for this species; but I can specify very few counties southward of the Forth and Clyde, from which it is likely to be wholly absent. Peebles, Selkirk, and possibly some others, may be without it. As may be seen, I find no authority for its occurrence in the Lake province.

ROSA CINNAMOMEA, *Linn.*

Area (10 * [12] 13).

Alien. Said to have been found in the wood at Aketon, near Pontefract, and at Birkhill, Galston, Ayrshire. Recently, another locality has been given, on which Mr. Borrer remarks, "The rose in Howrey Field, Keswick, which has been mistaken for R. cinnamomea, is the American R. lucida. There are two plants of it in the hedge, near the junction of the river Greta with the Derwent, and they are spreading by their creeping roots." (Phytologist, ii. 427).

ROSA DICKSONI, *Lindl.*

Hibernian? Reported to have been found wild in Ireland, which is rendered very doubtful by the remarks of Mr. Mackay, in the Flora Hibernica.

354. SANGUISORBA OFFICINALIS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14.
South limit in Cornwall, Dorset, Herts, Cambridgeshire.
North limit in Berwickshire and Kirkcudbrightshire.
Estimate of provinces 14. Estimate of counties 40.
Latitude 50—56. Scottish (?) type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends almost to the coast level, in the Peninsula.
Ascends to 150 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Pratal. The distribution of this plant does not correspond well with any of our types. From the Scottish type it differs by extending more to the southward, and less to the northward; the plant being, indeed, scarce and quite southern in Scotland; although prevalent chiefly in the north and west of England. It is thus a link between the English and Scottish types, while its limited area and low census remove it from the British type.

SANGUISORBA MEDIA, *Linn.*

Area [13].

Incognit. Stated to have been found by Mr. George Don, in the west of Scotland; but some variety of the British species, P. officinalis, would seem to have been mistaken for the American plant.

355. POTERIUM SANGUISÓRBA, *Linn.*

Area 1 2 3 4 5 6 7 8 * 10 11 * 13 * 15.
South limit in Devon, Isle of Wight, Kent.
North limit in Forfarshire and near Glasgow.
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.
Native. Rupestral and Glareal. Though found in some few habitats as far north as the borders of the Highlands, this plant is so scarce in Scotland, and so little entitled to be called scarce in the more southern provinces of England, that it may be assigned to the English type, even while growing farther north than the Sanguisorba officinalis, which has been assigned to the Scottish type. The latter, indeed, is intermediate between English and Scottish; the present plant between English and British. Perhaps the county census would be nearer 50 than 40.

356. ALCHEMILLA VULGARIS, *Linn.*

Area, general.
South limit in Devon, Dorset, Surrey ?
North limit in Orkney, Caithness, Sutherland.
Estimate of provinces 18. Estimate of counties 75.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends almost to the coast level, in the Channel.

Ascends to 1200 yards, in the West Highlands.

Range of mean annual temperature 50—35.

Native. Pratal, &c. A scarce plant in the south-east of England, and apparently so in the Peninsula: more northward, and in the mountainous provinces, it becomes frequent or common. Absent, or rare and overlooked, in Shetland and the Hebrides.

357. ALCHEMILLA ALPINA, *Linn.*

Area * * * * * * * * * 10 * 12 * * 15 16 17 18.

South limit in Yorkshire and Westmoreland.

North limit in the Hebrides and Sutherland.

Estimate of provinces 6. Estimate of counties 15.

Latitude 54—60. Highland type of distribution.

A. A. regions. Superagrarian—Superarctic zones.

Descends to 150 yards, in the East Highlands.

Ascends to 1400 yards, in the same province.

Range of mean annual temperature 45—34.

Native. Pascual and Rupestral. Abundant in many tracts of the Highlands, both on the mountains and in the valleys. It descends to a slight altitude, even in England, in the immediate vicinity of high hills; and it is usually one of the first "alpine" plants met with, on approaching the bases of the mountains, while passing inland from the coasts of the Highland provinces. Dr. Dickie informs me that it grows within 150 feet of the summit of Ben-muich-dhu, and I have seen it above 1300 yards on Ben Lawers and Ben Nevis. Occasionally carried down to the coast, along the course of rivers in Scotland.

ALCHEMILLA CONJUNCTA, *Bab.*

Area [12 * * 15].

Incognit? Said to have been collected by Mr. J. E. Bowman, in Gatesgarth Dale or Pass, in Cumberland; as also by Mr. G. Don, on the Clova Mountains. Mr. Don's specimens are still in herbaria; but I suspect some mistake, the specimens appearing so like those from gardens. And the late Mr. Bowman expressly stated, that the plant brought by himself, from Gatesgarth Dale, was A. alpina, which remained unchanged in his garden. Sir Walter Trevelyan brought specimens from Faroe. Mr. Twining collected others in Switzerland. Specimens from Gouan are in Sir William Hooker's herbarium, supposed to have been collected on the Pyrenees. Probably Don's name of Alchemilla argentea should justly be preferred before the newer name given to the species by Mr. Babington; but the latter is free from all ambiguity or misapplication, and therefore retained here.

358. ALCHEMILLA ARVENSIS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and Sutherland.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 150 (or 550) yards, in the East Highlands.
Range of mean annual temperature 52—45.

Native. Glareal and Agrestal. A very common species; but not recorded in the lists for Shetland and the Hebrides. I have not seen it higher than Loch Tay, which is estimated at about 150 yards. Dr. Dickie records it so high as 1715 feet in Aberdeenshire.

359. MESPILUS GERMANICA, *Linn.*

Area (1) 2 3 * 5 * * * 9.
South limit in Sussex, Kent, Devon?
North limit in Cheshire or Worcestershire.
Estimate of provinces 4. Estimate of counties 5.
Latitude 50—54. Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends —? Ascends —? (Altitude trifling).
Range of mean annual temperature 50—48.
Denizen? Septal or Sylvestral. It would perhaps be more judicious to count this tree among our aliens; but as some botanists would seem to hold it a true native, the intermediate category is taken for it. Reported from the counties of Devon, Sussex, Kent, Surrey, Worcester and Chester; very dubious as a native of Devon; and equally so, perhaps, in Chester and Worcester.

360. CRATÆGUS OXYACANTHA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Sutherland or ——?
Estimate of provinces 17. Estimate of counties 75 or 80.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 500 yards, in North Wales.

Range of mean annual temperature 52—44.

Native. Septal, &c. By the agency of man and birds, the Hawthorn is distributed plentifully through Britain, even into Shetland; but apparently not native in the North Isles; and it is much more plentiful, in its wild state, on the commons, &c., in England, than is the case in Scotland. There is, or was, a bush of considerable size, growing out of a rock above Killin, Perthshire, at nearly 400 yards of elevation; and small bushes were seen at a greater altitude in Caernarvonshire.

361. COTONEASTER VULGARIS, *Lindl.*

Area * * * * * * 7.

South and North limits in Caernarvonshire.

Estimate of provinces 1. Estimate of counties 1.

Latitude 53—54. Local type of distribution.

Agrarian region. Midagrarian (?) zone.

Descends —? Ascends —? (100 or 200 yards ?)

Range of mean annual temperature, say 48—47.

Native. Rupestral. Hitherto recorded only from one spot, the Great Ormes-head, a rocky promontory of the Caernarvonshire coast. It is likely to be found also on Penmaen Mawr, in the same county; and if found there, the circumstance will fully confirm a suspicion which I expressed long ago, that it was the Cotoneaster which Mr. Griffith discovered on those two hills, and published under the name of Salix reticulata.

362. PYRUS COMMUNIS, *Linn.*

Area 1 2 3 4 5 * 7 8 * 10 (11 * 13 * 15).
South limit in Devon, Isle of Wight, Kent.
North limit in Yorkshire and Anglesea.
Estimate of provinces 8. Estimate of counties 20.
Latitude 50—54. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—48.

Denizen. Septal, &c. So seldom found in a wild state, as to occasion some doubt whether all the examples so seen may not have arisen from the fruits of the orchard. Should this supposition be allowed, the nativity of the tree in this country could scarcely be contended for.

363. PYRUS MALUS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Forfarshire and Argyleshire.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—57. English (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Septal. It is impossible now to say in what spots this species is truly a native, of untainted descent, and in what spots the trees or bushes, now existent, have

originated immediately or remotely from those of the orchard. The Rev. G. Gordon considers it certainly introduced into Moray; and it is omitted from the Flora Abredonensis. Mr. Gardiner still collects it in Don's habitat near Glammis. I observed a bush of it by the Dochart, near Killin; but could not suppose it native there. Said to be rare about Edinburgh, frequent about Glasgow, common about Berwick on Tweed. Type of distribution almost British.

364. PYRUS TORMINALIS, *Sm.*

Area 1 2 3 4 5 6 7 8 * * (11).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Nottinghamshire and Anglesea.
Estimate of provinces 8. Estimate of counties 30.
Latitude 50—54. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—48.
Native. Sylvestral. Though still to be found in most of the English counties southward from York or Derby, this species is probably in course of extirpation by improved farming and other rural changes.

365. PYRUS ARIA, *Sm.*
365,b. PYRUS PINNATIFIDA, *Ehrh.*
365,c. PYRUS INTERMEDIA, *Ehrh.*

Area 1 2 3 4 5 6 7 8 * 10 11 12 (13 14 15) 16 17.
South limit in Devon, Isle of Wight, Kent.

North limit in Sutherland and Argyleshire.
Estimate of provinces 13. Estimate of counties 40.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 300 yards, or upwards, in North Wales.
Range of mean annual temperature 51—45.

Native. Sylvestral and Rupestral. Decidedly more frequent in England than in Scotland; but since it is reported to be wild so far northward as the county of Sutherland, it may be deemed nearer to the British than to the English type, although one of the more sparingly distributed examples of the former. The P. pinnatifida appears to be only a trifling, though somewhat remarkable variety; and it is a planted tree in several of the localities recorded for it. The P. intermedia has more the aspect of a distinct species; and might be so held, were it not connected to P. Aria by other varieties, again intermediate between itself and the latter.

366. PYRUS AUCUPARIA, *Gaert.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 75.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends nearly to 900 yards, in the East Highlands.
Range of mean annual temperature 50—38.

Native. Rupestral and Sylvestral. Rather scarce in the south-east of England; and seen but seldom above

700 yards of altitude, though occurring at 2600 feet, if not upwards, in Cumberland, and rather above that altitude in Forfarshire. In these elevated spots, it is a slender-stemmed shrub, growing from the crevices of rocks. On Loch na Garr, in Aberdeenshire, there are trees of two feet in girth, at 600 yards of altitude above the sea level.

PYRUS DOMESTICA, *Sm.*

Area [1 2 3 (5) 8].

Alien. Reported to grow in Cornwall, Devon, Hants, Worcestershire, Leicestershire and the Metropolitan circuit. But all the alleged habitats appear to have originated in errors, with the exception of one in Wyre Forest, on the borders of Worcestershire, in which Mr. Lees has intimated that only a single and very aged tree exists. (See Supplement to the New Botanist's Guide.) It may be difficult to explain how the one tree came to its habitat; but we cannot hold the species native on the faith of a single tree.

367. EPILOBIUM ANGUSTIFOLIUM, *Linn.*

Area, general.
South limit in Dorset, Isle of Wight, Kent.
North limit in Shetland, Orkney, Sutherland.
Estimate of provinces 18. Estimate of counties 70.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in Thames province.
Ascends to 850 yards, or upwards, in East Highlands.
Range of mean annual temperature 50—39.
Native. Sylvestral, Rupestral, &c. Not a common or

even a frequent species, although widely spread through Britain; nor is it very clear whether 60 or 70 counties might be the nearest census for it. Two principal varieties occur. One (E. brachycarpum, of Leighton) with short fruit and leaves broad at the base; the other (E. macrocarpum, of Stephens) with elongated fruit and leaves tapering into a narrow base: differences of size being also observable in their flowers. The two, however, are closely connected by intermediate varieties; and corresponding diversities of leaves and flowers may be frequently seen in other species of the genus.

368. EPILOBIUM HIRSUTUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 * * [18].
South limit in Cornwall, Isle of Wight, Kent.
North limit in Forfarshire and near Glasgow.
Estimate of provinces 15. Estimate of counties 60.
Latitude 50—57. British type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Paludal. Common in England; but terminating so early northward as almost to bring it under the English type. Supposed to have been introduced into Moray; unnoticed in the Aberdeen Flora; said to be rare in Forfarshire, occasional about Glasgow, very common around Edinburgh, common in Berwickshire.

369. EPILOBIUM PARVIFLORUM, *Schreb.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 * 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray and the Hebrides.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Paludal. One of the few species which grow in the Outer Hebrides, and yet fail to reach the more northerly isles of Orkney and Shetland. So far as recorded information goes, it is absent also from the three or four counties of the North Highlands. Does the "Epilobium hirsutum," of Lowe's list of Orkney plants, intend the present species?

370. EPILOBIUM MONTANUM, *Linn.*
370,b. EPILOBIUM LANCEOLATUM, "*S. et M.*"

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 600 yards, in East Highlands (Dickie).
Range of mean annual temperature 51—41.

Native. Sylvestral. I have traced this species up to 1600 feet, in the valleys of the Grampians; and by Dr. Dickie it has been seen at 1800 feet. This higher altitude induces me to consider the species as rising into the arctic region. Mr. Babington refers the E. lanceolatum to the present species; but my specimens, from the neighbourhood of Bristol, look very like E. roseum.

371. EPILOBIUM ROSEUM, *Schreb.*

Area 1 2 3 * 5 6 * 8 * 10 * * * * 15.
South limit in Devon, Hants, Sussex.
North limit in Moray and Forfarshire.
Estimate of provinces —— ? Estimate of counties —— ?
Latitude 50—58. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends nearly to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—47.

Native. Sylvestral. An obscurely characterized species, which is frequently represented by specimens of E. montanum or E. parviflorum; and being thus little known to botanists, its localities must remain still less known, until some circumstance shall call more decided and careful attention thereto.

372. EPILOBIUM PALUSTRE, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.

Latitude 50—61. British type of distribution.

A. A. regions. Inferagrarian—Inferarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 650 yards, in the East Highlands.

Range of mean annual temperature 51—40.

Native. Paludal. Not a very common species; although so frequent that it may be difficult to select any counties from which this plant is likely to be quite absent. Rare above the agrarian region.

373. EPILOBIUM TETRAGONUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 * 18.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Orkney, Hebrides, Moray.

Estimate of provinces 18. Estimate of counties 80.

Latitude 50—60. British type of distribution.

A. A. regions. Inferagrarian—Inferarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 700 yards, in the East Highlands.

Range of mean annual temperature 51—40.

Native. Paludal and Septal. Unknown in Shetland, and unrecorded from the North Highlands, though likely enough to be found in that province. Assumes so much of the general habit of E. alsinifolium, by the sides of streamlets on the mountains, as to be scarce distinguishable from that species. E. virgatum is given for a variety of the present, in the London Catalogue; but, perhaps, it is referrible rather to E. palustre, or, like many other book-species, is made up from the intermediately aberrant forms of both.

374. EPILOBIUM ALPINUM, *Linn.*

Area * * * * * * 7 [8 * 10] 11 [12] * * 15 16 17.
South limit in Caernarvonshire and Durham.
North limit in Sutherland and Ross-shire.
Estimate of provinces 5. Estimate of counties 12.
Latitude 53—59. Highland type of distribution.
Arctic region. Inferarctic—Superarctic zones.
Descends to 450 or 500 yards, in the East Highlands.
Ascends to 1300 yards, in the same province.
Range of mean annual temperature 41—34.

Native. Uliginal. Rather plentiful on the Highland mountains; very local in England. Dr. Dickie says that it formerly occurred on the banks of the Dee, near Aberdeen, almost down to the level of the sea; doubtless brought thither during floods.

374,b. EPILOBIUM ALSINIFOLIUM, *Vill.*

Area * * * * * * 7 * * 10 11 12 13 * 15 16 17.
South limit in Caernarvonshire and Yorkshire.
North limit in Sutherland, West Inverness, Aberdeen.
Estimate of provinces 8. Estimate of counties 15.
Latitude 50—59. Highland type of distribution.
A. A. regions. Superagrarian—Midarctic zones.
Descends to 200 yards, or even lower, in North Wales.
Ascends to 950 or 1000 yards, in the East Highlands.
Range of mean annual temperature 45—37.

Native. Uliginal. Possibly this may be only a more luxuriant form of E. alpinum, to which several botanists have reduced it; and the two do so gradually approximate

that their intermediate forms might be assigned to either of them with about equal appearance of correctness. On the other side, mountain examples of E. tetragonum occasionally pass for the present species.

375. ŒNOTHERA BIENNIS, *Linn.*

Area (1 2 3 4 5 6 7 * 9 10 11 * 13).

Alien. Introduced from America, and now to some degree established on the coasts, sandy wastes, and cultivated ground in this country; so that it finds place in various local lists, as well as in the more general Floras of Britain.

376. ISNARDIA PALUSTRIS, *Linn.*

Area * 2.

South and North limits in Hants and Sussex.

Estimate of provinces 1. Estimate of counties 2.

Latitude 50—51. Local or English type of distribution.

Agrarian region. Inferagrarian zone.

Descends——? Ascends——? (50 yards, more or less.)

Range of mean annual temperature, probably, about 50.

Native. Paludal or Lacustral. Three localities for this very local plant have been recorded, two of them in Hampshire, one in Sussex. Being a species of inconspicuous size and flowers, it may readily have been overlooked in other spots.

377. CIRCÆA LUTETIANA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Sutherland, Aberdeenshire, Argyleshire.
Estimate of provinces 17. Estimate of counties 70.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Sylvestral. Frequent in England; scarce in Scotland. According to a foot-note, in the Collectanea for a Flora of Moray, page 2, this species was seen "between Navidale and Ord of Caithness, in 1826," which is the only locality on record for the North Highlands.

378. CIRCÆA ALPINA, *Linn.*
378,b. CIRCÆA INTERMEDIA, *Ehrh.*

Area * * * * 5 6 7 8 9 10 11 12 13 14 15 16 17 18.
South limit in Monmouth, Warwick, Nottingham shires.
North limit in Orkney, Sutherland, Ross-shire.
Estimate of provinces 14. Estimate of counties 40.
Latitude 51—60. Scottish type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends to the coast level, in the West Highlands.
Ascends to 150 or 200 yards, in the East Highlands.
Range of mean annual temperature 47—45.

Native. Sylvestral, &c. Rather a scarce plant, though to be found possibly in upwards of 40 counties. In their

extreme forms this one and Lutetiana are readily distinguishable, and appear as much like permanent species as do many other pairs of allied species; but when the 'intermedia' is placed between them, it becomes extremely difficult to specify or find any strong distinction; the two extremes being so nearly connected by the intermediate variety, that all clear distinctions cease. The occasional perfection of one cell in the fruit of C. alpina, seems an insufficient character; both cells being usually abortive or obsolete.

379. HIPPURIS VULGARIS, *Linn.*

Area 1 2 3 4 5 6 * 8 9 10 11 12 13 14 15 16 * 18.
South limit in Dorset, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 70.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—46.
Native. Lacustral or Paludal. Not a common species, although widely distributed. Apparently very scarce and local in the Peninsula; and still unrecorded from North Wales and the North Highlands; although the probability of its occurrence in those provinces seems strong enough to warrant their inclusion in the provincial estimate.

380. MYRIOPHYLLUM VERTICILLATUM, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 * * * * * * [18].
South limit in Dorset, Sussex, Kent.

North limit in Northumberland and Lancashire.
Estimate of provinces 11. Estimate of counties 40.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—48.

Native. Lacustral. Rather a scarce plant, though perhaps often overlooked. Dr. Neill records it in his Tour, as having been observed in Orkney; but there seems sufficient reason to suspect that M. alterniflorum, a more boreal species, then unknown to the botanists of Britain, may have been mistaken for this one.

381. MYRIOPHYLLUM SPICATUM, *Linn.*

Area general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Hebrides, Sutherland.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—46.

Native. Lacustral. As recorded in books, the localities for this species will probably include many of those more properly belonging to M. alterniflorum; and it may be considered dubious whether some of the more northern counties do produce this at all. The county census is taken at 81, because the genus is omitted from the Flora of Shetland.

382. MYRIOPHYLLUM ALTERNIFLORUM, *De C.*

Area 1 2 3 * 5 * * 8 9 * * * 13 14 15 * * 18.
South limit in Cornwall, Isle of Wight, ———— ?
North limit in the Hebrides, ———— ?
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—59. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 yards, in the East Highlands.
Range of mean annual temperature 51—43.

Native. Lacustral. Having only been lately distinguished from the other two species, the distribution of this present one can be yet shown very incompletely. It is likely that all the provincial vacancies will be filled up, as the result of longer observation, and that this species will eventually be found the most frequent and widely distributed of the three.

383. CALLITRICHE VERNA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 650 yards, in the East Highlands.
Range of mean annual temperature 52—40.

Native. Lacustral and Inundatal. Thus indicated, the distribution of C. verna may be understood to comprehend

also that of C. platycarpa and that of C. pedunculata; for since the disunion of these three alleged species, it has become impossible to say what is the true distribution of C. verna apart from the other two. Before this can be done satisfactorily the localities will require to be verified afresh by botanical eyes familiar with the distinctions of the three alleged species.

384. CALLITRICHE PLATYCARPA, *Kutz.*

Area * 2 3 * 5 * * 8 * 10 * * 13 14 * 16 * 18.
South limit in the Isle of Wight and ———— ?
North limit in the Hebrides and ———— ?
Estimate of provinces 18. Estimate of counties 82.
Latitude 50— ? British type of distribution.
Agrarian region. Inferagarian—Superagrarian zones.
Descends to the coast level, in the Channel.
Ascends probably to 400 yards, in East Highlands.
Range of mean annual temperature 51—43.
Native. Inundatal (and Lacustral ?) The distribution of this species, as above given, will be understood to be only something between an outline and a conjecture, which the data in my possession do not enable me to fill up and make certain. The latitude is left doubtful, because the species will likely be found in Orkney and Shetland; in which case, the present apparent limit of 59 will be carried to 61.

385. CALLITRICHE PEDUNCULATA, *De C.*

Area 1 2 3 * 5 * 7 8 9 10 * * * * 15 16 17 18.
South limit in Cornwall, Isle of Wight, Sussex.

North limit in the Hebrides, Sutherland, ———— ?
Estimate of provinces 18. Estimate of counties 82.
Latitude 50— ? British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Channel province.
Ascends to 750 yards, or upwards, in the East Highlands.
Range of mean annual temperature 51—39.

Native. Lacustral and Inundatal. This species, distinguished by its small fruit, may be equally common as C. verna, and apparently is more of a mountain plant than either of the allied species. On Ben Aulder, it might be deemed within the midarctic zone; and almost so in the small loch above Glen Callater, which I reckoned to be 750 yards above the sea. C. pedunculata is frequently misnamed C. autumnalis. The name of the former will mislead; the fruit being usually or always sessile on the plants which grow in water.

386. CALLITRICHE AUTUMNALIS, *Linn.*

Area [* 2 3 4 * 6] 7 [8 9 10] 11 [12 13 14] 15 16 [17 18].
South limit in Caenarvonshire and ———— ?
North limit in ———— ?
Estimate of provinces —— ? Estimate of counties —— ?
Latitude 53— ? Scottish type of distribution.
Descends —— ? Ascends —— ?
Range of mean annual temperature 48— ?

Native. Lacustral. The frequent mistake of applying the name of this species to plants of C. pedunculata, has induced me to inclose all the provinces, excepting those from which I have inspected specimens of C. autumnalis. It is not improbable, however, that the area of the present species may be found to include most of the provinces from

Wales to the North Highlands or Isles. The localities on record in books are few of them trustworthy.

387. CERATOPHYLLUM DEMERSUM, *Linn.*

Area 1 2 3 4 5 * * 8 * * 11 * * 14 15.
South limit in Devon, Hants, Sussex, Kent.
North limit in Forfarshire and ———— ?
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—57. English (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Channel province.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—47.

Native. Lacustral. The two species of Ceratophyllum are probably often overlooked; and the provincial and comital census are in consequence estimated considerably above the numbers ascertained and recorded, in order to balance the under-estimate which would be made by adhering more closely to the actual amount of knowledge in relation thereto. Looking at the provincial area, the type of distribution would seem to be Germanic rather than British; but I am disposed to think that this is attributable to the paucity and incompleteness of our lists of plants in the westerly provinces.

388. CERATOPHYLLUM SUBMERSUM, *Linn.*

Area * 2 3 4 * * * * * 10 * * * 14.
South limit in Sussex and Kent.
North limit in Edinburghshire and Linlithgowshire.
Estimate of provinces — ? Estimate of counties — ?

Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Channel province.
Ascends to 50 or 100 yards, in Scotland?
Range of mean annual temperature 51—47.

Native. Lacustral. The distribution of the present species seems to be less known than that of the other; and it is probable that some of the localities are incorrectly referred to C. demersum, since botanists usually assign this latter name to any examples which they see without finding them in fruit. The counties of Sussex, Kent, Essex, Suffolk, Norfolk, York, Edinburgh and Linlithgow have been indicated, more or less doubtfully, for C. submersum.

389. LYTHRUM HYSSOPIFOLIUM, *Linn.*

Area * * 3 4 5 6 * 8 * 10.
South limit in Kent and the Isle of Wight?
North limit in Derbyshire and Yorkshire?
Estimate of provinces 6. Estimate of counties 12.
Latitude 50—54. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends probably to the coast level, in England.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 50—48.

Native. Inundatal. Scarce, and of uncertain occurrence in the few localities recorded for it. I have seen specimens from Cambridgeshire only. In the New Guide thirteen counties are recorded for it; but in how many of these it could now be found, or has ever been found, I am wholly unprepared to say. Dr. Bromfield marks it as an uncertain native of the Isle of Wight.

390. LYTHRUM SALICARIA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Perthshire, Argyleshire, Edinburghshire.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Paludal. Very local in the east of Scotland; much more plentiful in the western counties; frequent in England. The only locality in the East Highlands, as far as known to me is that of Loch Lubnaig, recorded by the late Professor Graham. I must have overlooked this conspicuous plant if it be there; for I only recollect seeing Epilobium angustifolium at the head of that lake, the showy blossoms of which may have drawn my attention from another plant with flowers of similar colour.

391. PEPLIS PORTULA, *Linn.*

Area, general?
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and Sutherland.
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 250 or 300 yards, in the East Highlands.

Range of mean annual temperature 52—43.

Native. Uliginal and Inundatal. Frequent in England; less so in Scotland. Authorities can be cited for all the provinces, excepting that of the Lakes, where I am almost confident of having seen it myself. Two counties are omitted in the estimate, because the plant is unnoticed in the lists for Shetland and the Hebrides. The presumption appears in favour of its occurrence in all the other counties.

392. TAMARIX ANGLICA, *Webb.*

Area (1 2 3 4).

Alien. Not even a naturalized plant in England; since, as far as hitherto shown, it grows only in places where it has been planted. The original locality of St. Michael's Mount, Cornwall, has no semblance whatever of being a native habitat. The lilacs and liburnums of our gardens are more naturalized than is this Tamarix, for they do spring freely and spontaneously from seed; and thus would spread themselves over the land if not destroyed.

393. BRYONIA DIOICA, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11.
South limit in (Devon?), Dorset, Wight, Kent.
North limit in Durham, Yorkshire, Cheshire.
Estimate of provinces 11. Estimate of counties 40.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagraraian —Midagrarian zones.
Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 51—48.

Native. Septal. Found in most of the English counties, although by no means a common plant. In Wales apparently much more rare; and as it may be wholly absent from some of the most northerly counties of England, the estimate of 40 may be rather over truth, although that of 30 would certainly be too low. Two Northumbrian localities are recorded for the Bryonia, in the Flora of Northumberland and Durham; but Mr. Chrisp informs me that the plant has probably been introduced thereto for ornamental purposes.

394. MONTIA FONTANA, *Linn*

Area, general.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Orkney, Sutherland, Hebrides.

Estimate of provinces 18. Estimate of counties 82.

Latitude 50—60. British type of distribution.

A. A. regions. Inferagrarian—Superarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to 1050 or 1100 yards, in the East Highlands.

Range of mean annual temperature 52—36.

Native. Lacustral, Inundatal, &c. Although not recorded in the Flora of Shetland, there seems so much probability of this easily overlooked species growing there, that the county estimate is made to include that group of isles. The range of latitude, as well as the northern limits assigned, however, are stated exclusively of Shetland; because these are given in correspondence with the state of ascertained knowledge and not set down from estimate or conjecture. In the damp periods of the year, the

Montia thrives as a weed on cultivated ground; it flowers on the mountains, in springs with a temperature of 38°, as also in pits and ditches while the temperature of the water is 60° of Fahrenheit.

395. ILLECEBRUM VERTICILLATUM, *Linn.*

Area 1.
South limit in Cornwall.
North limit in Devon.
Estimate of provinces 1. Estimate of counties 2.
Latitude 50—51. Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends scarcely above the coast level, in same province.
Range of mean annual temperature 52—50.
Native. Uliginal. A very local plant, as is evident from the indications of its area and census.

396. CORRIGIOLA LITTORALIS, *Linn.*

Area 1.
South limit in Cornwall.
North limit in Devon.
Estimate of provinces 1. Estimate of counties 2.
Latitude 50—51. Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the sea level, in the Peninsula.
Ascends only along the coast level, in same province.
Range of mean annual temperature 52.
Native. Littoral. Even still more local than the pre-

ceding species; and, like that one, it might be as correctly referred to the Local type.

397. HERNIARIA GLABRA, *Linn.*
397,c. HERNIARIA CILIATA, *Bab.*

Area 1 [2] 3 4 * * * 8 * * * * * [14] (15).
South limit in Cornwall and Middlesex?
North limit in Lincolnshire and ——?
Estimate of provinces 4. Estimate of counties 8.
Latitude 50—54. English or Local type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—48.

Native. Glareal. Reported to have been found in the counties of Cornwall, Somerset, Hants, Middlesex, Suffolk, Norfolk, Cambridge, Lincoln, Nottingham, Berwick and Perth. In Perthshire it is expressly allowed to be only an escape from a garden. Berwickshire is mentioned in a billet or report of a meeting of the Botanical Society of Edinburgh, and requires to be confirmed on the individual authority of some known botanist. The county of Nottingham rests on old and doubtful authority; and the same may be said of Somerset and Hampshire. I possess specimens only from Cornwall. I have seen no authenticated example of H ciliata; but neither in the specimens which are presumed to belong to that alleged species, nor in the characters indicated for it by Mr. Babington, can I find anything to warrant the conviction of its being a species truly distinct from H. glabra. The name of the latter, indeed, is a very bad one for a plant which is so variable in reference to pubescence.

HERNIARIA HIRSUTA, *Linn.*

Area [1 * 3 * * * * 8].

Incognit. The true Herniaria hirsuta has probably never occurred in England; the ciliated variety of H. glabra having been thus misnamed.

398. POLYCARPON TETRAPHYLLUM, *Linn.*

Area 1 2 * * * 6 * * * [10].

South limit in Cornwall, Devon, Dorset.

North limit in Glamorgan [and Yorkshire ?]

Estimate of provinces 3. Estimate of counties 4.

Latitude 50—52. Atlantic type of distribution.

Agrarian region. Inferagrarian zone.

Descends to the coast level, in the Peninsula.

Ascends, at the coast level, to South Wales.

Range of mean annual temperature 52—50.

Native. Glareal. A very scarce plant, reported from the five counties above mentioned. That of York cannot be received without confirmation; and that of Glamorgan, though probable enough in itself, needs better authority in its support.

399. SCLERANTHUS ANNUUS, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16 17.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Ross, Aberdeen, Argyle shires.

Estimate of provinces 17. Estimate of counties 80.

Latitude 50—58. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 300 or 350 yards, in the East Highlands.

Range of mean annual temperature 52—44.

Native. Glareal. Being omitted from the lists of species known in Shetland, Orkney, Hebrides, Sutherland and Caithness, it would seem that this common English plant becomes very scarce in the extreme north of Britain; though said to be frequent in Moray, and common about Aberdeen. The county census is estimated on the presumption that the plant will really grow everywhere, except in Orkney and Shetland, which still do not appear very unlikely habitats for a species which grows at above 300 yards of elevation in the valleys of the Grampians.

400. SCLERANTHUS PERENNIS, *Linn.*

Area [1] * 3 4 * * [7 * 9 * 11 * * * 15].

South limit in Kent.

North limit in Norfolk.

Estimate of provinces 2. Estimate of counties 4.

Latitude 51—53. Germanic type of distribution.

Agrarian region. Inferagrarian zone.

Descends to the coast level, in Ouse.

Ascends scarcely above the coast level.

Range of mean annual temperature 51—48.

Native. Glareal. A local plant, the range of which has been unduly extended by mistaking for it examples of S. annuus. I have myself seen S. perennis only from the counties of Suffolk (Mr. S. P. Woodward) and Norfolk (Miss Bell); but have frequently received S. annuus under the name of S. perennis.

401. BERBERIS VULGARIS, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 * 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Perthshire and Argyleshire.
Estimate of provinces 15. Estimate of counties 40.
Latitude 50—57. English (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in England.
Ascends to 150 yards, or upwards, in Scotland.
Range of mean annual temperature 51—46.

Denizen. Septal, &c. Admitted as a native by Henslow, Hooker and Babington; yet writers about our local botany frequently express doubts on the point. Thus, it is said to be "hardly wild" in Devon, a doubtful native of Somerset and the neighbourhood of Poole, "scarcely indigenous" in the Isle of Wight, doubtfully indigenous near Wrexham, "certainly introduced" into Moray and the neighbourhood of Aberdeen, &c., &c. I have seen it sparingly in several counties, though always under conditions to be suspected; and judging from my own observation, together with the frequently expressed doubts of other botanists, I cannot place it higher in the scale of civil claims than the second category, or that of the denizens. Berberaceæ were removed to proximity with Grossulariaceæ on a feeble analogy, in the London Catalogue; but being there, are so retained here for the sake of uniformity with the Catalogue which is taken for a temporary index to the present work.

402. EPIMEDIUM ALPINUM, *Linn.*

Area (1 * * * * * * * * 10 * 12 13 14 15 16).

Alien. Has been occasionally planted in woods for the purpose of imposing upon botanists, or introduced about houses and grounds for the sake of ornament. I am unaware of any sufficient reasons or facts for giving it place among British plants, otherwise than as an alien, not to be held fairly naturalized.

403. RIBES NIGRUM, *Linn.*

Area 1 2 3 4 5 * * (8) * 10 11 12 13 (14 15) 16.

South limit in Devon, Isle of Wight, Kent.

North limit in Isla and Northumberland.

Estimate of provinces 10. Estimate of counties 30.

Latitude 50—56. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends nearly to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 50—47.

Denizen. Sylvestral. Admitted as a native of Britain, by Henslow, Hooker, Babington and others. Dr. Bromfield deems it truly native in the Isle of Wight; and, in comparison with R. rubrum, writes of this species,—"Though less frequent, is not less certainly wild; but is only to be seen in very cool shady situations, mostly in our thickets of deep rotten bog, filled with a rank unwholesome vegetation of Œnanthe crocata." I have seen several of the known habitats; but none of them have appeared to me such as I could believe to be truly native localities. Cultivated up 300 or 400 yards in the Highlands.

404. RIBES RUBRUM, *Linn.*
404,b. RIBES PETRÆUM, "*Wulf.*"
404,c. RIBES SPICATUM, *Robs.*

Area 1 2 3 4 5 * * 8 9 10 11 12 13 14 15 16 * (18).
South limit in Devon, Isle of Wight, Sussex.
North limit in Moray, Aberdeenshire, Argyleshire.
Estimate of provinces 14. Estimate of counties 50.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 200 yards, in the East Highlands.
Range of mean annual temperature 50—45.

Native. Sylvestral, &c. Apparently a true native of Scotland and the north of England; and even in the south of England, also, according to very good botanical authorities. Thus, Dr. Bromfield writes,—"So common an Isle of Wight shrub, that there is scarcely a patch or copse of brushwood, however small, from which it is wholly absent, and some of our large woods produce specimens by hundreds."

405. RIBES ALPINUM, *Linn.*

Area * * * * 5 6 7 8 9 10 11 12 13 14.
South limit in (Glamorgan?), Warwick, Nottingham.
North limit in Edinburgh, Lanark, Renfrew shires.
Estimate of provinces 10. Estimate of counties 20.
Latitude 51—56. Scottish type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in Wales.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 49—46.

Native. Sylvestral, &c. A scarce species; but being one of little use either as an ornamental shrub or for its fruit, its habitats are more likely to be truly natural than are those for the other species, which are so generally cultivated in the gardens of Britain. The name "alpinum" is not very appropriate in this country, its localities being of slight elevation, and the species unrecorded from the Highland provinces.

406. RIBES GROSSULARIA, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 * 17 (18).

South limit in Cornwall, Dorset, Isle of Wight.

North limit in Aberdeenshire or Ross-shire.

Estimate of provinces 17. Estimate of counties 60.

Latitude 50—58. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Channel.

Ascends to 350 yards, in the East Highlands.

Range of mean annual temperature 51—43.

Denizen. Septal, &c. This is generally allowed to be an alien; but it readily becomes wild, and may be now considered as fully a naturalized Briton, as are many other 'denizens.' I class it with the latter, rather than with the aliens, very much on account of Dr. Bromfield's opinion, who writes to me, with the date of December, 1845, in these terms: "I firmly believe Ribes rubrum, nigrum, and Grossularia to be all truly indigenous with us;" that is, in the Isle of Wight. Northward, however, the Flora of Moray gives it as "certainly introduced." It is not recognized in that of Aberdeen, nor in the Edinburgh Catalogue; and in

the Floras of Glasgow and Berwick on Tweed, it is recorded in terms which apparently intend to deny its nativity, although ambiguously. The places in which it has been seen by myself, were all liable to suspicion; and yet I must admit that some of them would have passed unquestioned and readily, as true localities for any native shrub otherwise unsuspected.

407. TILLÆA MUSCOSA, *Linn.*

Area * [2] (3) 4.
South limit in Suffolk.
North limit in Norfolk.
Estimate of provinces 1. Estimate of counties 2.
Latitude 52—53. Local or Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Ouse province.
Ascends to 50 yards, more or less, in same province.
Range of mean annual temperature 49—48.

Native. Glareal? A very local plant; and one whose situations of growth are variously stated in respect of humidity, as "moist, barren, sandy, heaths," — "barren sandy heaths," — "driest spots," — "gravel walks," — &c. In Salter's list of plants around Poole, in Dorsetshire, this is marked as "very common;" but that list being the only authority for it in the province of Channel, I fear some error. Through cultivation as a botanical curiosity, it has become naturalized in places near London; but I know not of any truly native habitat in the province of Thames. The British Flora says, "in various parts of England."

408. SEDUM RHODIOLA, *De C.*

Area * * * * * * 7 * * 10 11 12 13 14 15 16 17 18.
South limit in Merionethshire and Yorkshire.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 10. Estimate of counties 25.
Latitude 52—61. Highland type of distribution.
A. A. regions. Midagrarian—Superarctic zones.
Descends to the coast level, in West and East Lowlands.
Ascends to 1300 yards, in East Highlands.
Range of mean annual temperature 48—34.
Native. Rupestral and Littoral. Rather frequent on rocks in the arctic region, and descending to those of the sea coasts in Scotland, on which it must be referred to the midagrarian zone.

409. SEDUM TELEPHIUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 * 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney ? Highlands ?
Estimate of provinces 17. Estimate of counties 70.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 250 or 350 yards, in East Highlands.
Range of mean annual temperature 52—43.
Native. Rupestral, Septal, &c. Possibly the distribution is made too extensive in the formula above. The late Author of the Flora of Shetland replied to my inquiry on the point, that he had no doubt whatever as to this Sedum

being truly native in Shetland; and as it is equally so on the south coast of England, I have not felt warranted in rejecting many of the intermediate localities, which otherwise appear too doubtful for full reliance; especially when we keep in recollection that it has long been a plant of cottage gardens, and is very tenacious of life. It stands as an introduced plant, in the Floras of Moray and Aberdeen; and in the Orkney list, only on the single authority of Lowe. I have observed it near Dumbarton, Perth, Kingussie and Castletown, in the Highland provinces;—too near houses, and only near houses, in all these localities. On the whole, the term 'denizen' might be more appropriate in Scotland; although there appears no reason to question its nativity in England.

410. SEDUM VILLOSUM, *Linn.*

Area * * * * * * * * * 10 11 12 13 14 15 16.
South limit in Yorkshire and Westmoreland.
North limit in Aberdeenshire, Moray, Argyleshire.
Estimate of provinces 7. Estimate of counties 20.
Latitude 54—58. Scottish type of distribution.
A. A. regions. Superagrarian—Inferarctic zones.
Descends to 50 or 100 yards above the coast level.
Ascends to 700 yards (?) in East Highlands.
Range of mean annual temperature 46—40.

Native. Uliginal. The ranges of this species are given somewhat uncertainly, in connexion with altitude. Mr. W. Wilson observed it "half way up the mountain" of Ben Lawers, which is much higher than I have chanced to see it, and which may be even above the inferarctic zone. On the other hand, some of the lowest spots in which it

occurs, in the Lowlands, may possibly be below the super-agrarian zone.

411. SEDUM DASYPHYLLUM, *Linn.*

Area (1 2 3 4 5 * 7 8 * 10 * [12] * 14).

Alien? Hooker, Henslow and Babington allow this species to pass muster with the genuine natives of Britain; and Webb and Coleman enumerate it unquestioned in their list of Herts plants. Notwithstanding this weight of authority on one side, I still hesitate to include it even among the denizens. Almost all the localities given in precise terms, refer to walls; and many of these are on walls to which the plant was very likely to have been introduced through cultivation, as, "walls near Kew," — "wall near Chelsea Hospital," — "old Abbey walls," — "garden walls below Clifton," — &c. &c. The few exceptions, in which "hills" and "rocks" are mentioned, rest on authority not in itself strong, and seldom corroborated by any second observer. Under these circumstances, should the species turn out to be indigenous in any part of Britain, it will probably be far more locally so, than is indicated by the area given above.

412. SEDUM ANGLICUM, *Linn.*

Area 1 2 3 4 5 6 7 * 9 * 11 12 13 14 15 16 * 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Hebrides, Moray.
Estimate of provinces 16. Estimate of counties 40.
Latitude 50—61. Atlantic type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.

Descends to the coast level, in the Peninsula.

Ascends to (nearly) 1100 yards, in North Wales.

Range of mean annual temperature 52—38.

Native. Rupestral. It may at first appear incorrect to refer to the Atlantic type a species which is so nearly general in its provincial area. Nevertheless this is truly one of the most remarkable examples of that type, with a slight approximation towards the British also. It occurs in so many localities along the western coasts of England and Scotland, and often in such profusion, as to be one of the more common plants there. But when our attention is directed to the eastern coasts, we find a very striking difference; for then it ranks at once among the rare plants. It has been reported from Kent, Suffolk and Norfolk (one or both), Northumberland, Fife, Forfar, and Elgin; but in all these counties only very locally. In the inland counties it is scarcely found at all. Thus, notwithstanding its occasional appearance on the east side of the island, it is preeminently a plant of western distribution; and in this respect it associates with the Cotyledon Umbilicus and Pinguicula lusitanica, plants remarkable for their western tendency, without being absolutely restricted to the western provinces.

413. SEDUM ALBUM, *Linn.*
413,b. SEDUM TURGIDUM, "*Ram.*"

Area (1 2 3 4 5 [6] 7 8 * 10 11 [12] * * 15).

Alien? Similar reasons with those mentioned under S. dasyphyllum, induce me to place the present species also in the alien category. On looking over the localities which I have compiled together, only two exceptions can be made to the presumption of an alien origin. In the

New Guide, Mr. Lees reports it as "a genuine product of Nature on the Malvern rocks, at about 800 feet." And several botanists have recorded it from the neighbourhood of Bath or Bristol, in terms which may lead to the belief of its being native there also. The counties of Pembroke and Westmoreland require to be confirmed on better and more recent authority; especially as S. anglicum is occasionally mistaken for S. album. The question of nativity appears almost to be limited to this, for the present, 'Is Sedum album a native upon the Malvern rocks?' Mr. Babington mentions S. turgidum in his Manual of British Botany, but indicates no locality for it; and the plant is unknown to me as anything distinct from S. album.

414. SEDUM ACRE, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Sutherland, Hebrides.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 250 yards, in the East Highlands.
Range of mean annual temperature 52—44.

Native. Glareal and Rupestral. The Rev. Mr. Rutherford sends this species from Kingussie, in Moray, to the Botanical Society of London. On account of that locality the altitude of 250 yards is indicated for the plant; though I have not myself seen it so high, northward of the Forth. If truly native there, it is probable that the temperature might be correctly reduced to at least one degree lower; the hourly observations made for the British Association

tending to establish a lower mean than 44 for the place mentioned. But it would seem to be a general rule, that observations taken hourly give a higher mean for the year than is given by calculating the temperature from the means of the daily and monthly extremes.

415. SEDUM SEXANGULARE, *Linn.*

Area [1 (2 3 4) 5 * * * * 10].

Alien? I had cast the distribution of this species into the formula adopted for the natives, although in doubt as to the propriety of thus treating it. While these pages are going through the press, Mr. Newman favours me with some remarks on the species of Sedum, which induce me to change the formula, and remove S. sexangulare into the category of aliens. Hooker and Babington allow it to pass, without brand, as a true native. Henslow admits it among the native plants of Cambridgeshire. Mr. Newman, who has paid much attention to the Sedums, and seen their habitats in Wales, holds the S. rupestre and Forsterianum to be two distinct species, and both native; S. glaucum, if aught else than reflexum, to be "a nonentity, as regards Britain"; S. reflexum and sexangulare to be unsatisfactory, in the character of natives.

416. SEDUM REFLEXUM, *Linn.*
416,b. SEDUM GLAUCUM, "*Donn.*"

Area 1 2 3 4 5 6 7 8 9 10 11 * (13 14 15).
South limit in Devon, Isle of Wight, Sussex.
North limit in Northumberland or ————?
Estimate of provinces 11. Estimate of counties 30.

Latitude 50—56. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 150 or 200 yards, in England.

Range of mean annual temperature 51—48.

Native? Rupestral and Glareal. Extremely perplexing to decide whether and where this is native in England. Most of the localities are expressly stated to be on walls and banks, about villages and the ruins of old buildings; and such localities must be suspected in the case of a plant so frequently cultivated in gardens. I have never seen a thoroughly trustworthy locality for it, and set down the distribution as I find the recorded information suggest; cutting off the Scottish habitats, which appear still more questionable than those in England.

416,c. SEDUM RUPESTRE, *Linn.*

416,d. SEDUM FOSTERIANUM, *Sm.*

Area 1 2 * (4) 5 7 (8 * 10 11 12) 13.

South limit in Devon and Dorset.

North limit in Wigtonshire and Denbighshire.

Estimate of provinces 6. Estimate of counties 10.

Latitude 50—55. Atlantic type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 300 or 400 yards, in North Wales (Winch).

Range of mean annual temperature 52—45.

Native. Rupestral. These two alleged species are to me still inexplicable, and their localities inextricable; and chiefly on this latter account I am under the necessity of treating their distribution in combination. The "S. rupestre," of English Botany, appears in my eyes to be simply

a slight variety of S. reflexum; while the S. Fosterianum, of the same work has somewhat the look of a distinct species. But with the specimens communicated to my herbarium by botanical friends, the converse holds better; those labelled "rupestre," looking more distinct, and more like the figures of "S. Fosterianum." I have never seen either in their reported habitats; and it is not easy to judge from dried examples.

417. SEMPERVIVUM TECTORUM, *Linn.*

Area (1 2 3 4 5 * 7 8 9 10 11 * 13 14 15).

Alien. This plant affords a fine instance of the proneness of human beings to follow blindfold any example once set, without taking the trouble to think whether it be right or wrong, wise or foolish. So far as I am aware, there never has been a locality announced for the Sempervivum which had any pretensions to be accounted natural; and yet, after being once enumerated among British plants, every succeeding writer retains the plant as a thing of course. And being kept in the more general Floras, the authors of most of the local Floras (17 in 20) duly enter it in their own pages also.

418. COTYLEDON UMBILICUS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 * 12 13 * * 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Argyleshire and Yorkshire.
Estimate of provinces 14. Estimate of counties 40.
Latitude 50—57. Atlantic type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 250 or 300 yards, in North Wales.

Range of mean annual temperature 52—47.

Native. Rupestral. Plentiful in many of the counties along the western coasts of Britain; running eastward, along the southern coast, into Kent; and found also sparingly in some few inland spots within the eastern provinces of Ouse, Trent and Humber. Notwithstanding those few exceptional localities, inland or eastern, the Cotyledon affords one of the most perfect examples of the Atlantic or Western and Southwestern type of distribution, as already intimated under the head of Sedum anglicum.

COTYLEDON LUTEA, *Huds.*

Area [1 * 10].

Incognit. Stated to have been brought from Somerset into Clement's garden, where it was seen by Hudson; also from Yorkshire, into the Chelsea gardens, brought by Hudson himself. As it is quite beyond belief that so conspicuous a plant should have escaped modern observation in those counties, we are forced to conclude that some egregious error or imposition occurred. We have here a fair example of the risk of error, from relying upon garden plants which are *supposed* to have been found wild.

SAXIFRAGA ROTUNDIFOLIA, *Linn.*

Area [12].

Incognit. "Saxifraga rotundifolia, too, was found a few years ago among the rocks in the vale of Newlands, but has since been searched for in vain" (Mr. G. S. Gibson,

in Phytologist, ii. 376). If ever found there, it had doubtless been first planted by some of the Keswick guides.

SAXIFRAGA COTYLEDON, *Linn.*

Area [12].

Incognit. Mr. Wright has found "another Saxifrage, allied to S. Aizoon, wild on rocks at Crossthwaite, Westmoreland, for which he showed me, as the same species, S. Cotyledon, planted on a wall by Troutbeck bridge. We visited these places in vain." (Mr. Borrer, in Phytologist, ii. 429.) Surely not "in vain"? Mr. Borrer's purse would reward the attempt, and possibly may ensure success for some future tourist; since it would be easy to carry a few plants from Troutbeck bridge to Crossthwaite.

419. SAXIFRAGA GEUM, *Linn.*
419,d. SAXIFRAGA ELEGANS, *Mack.*

Area (10 * 12 13).

Alien in Britain. Native Hibernian. Mr. Backhouse says that it is naturalized near Weathercote cove, four or five miles from Ingleton, in Yorkshire. And Dr. J. D. Hooker has given me specimens from Lanarkshire. It is also pretended to have been found wild in the Lake province. On this point Mr. Borrer says, "Saxifraga Geum has been reported to be an English plant on the sole authority of Mr. Wright, who 'has discovered it at the head of the Duddon in Bowfell,' and he gave me a specimen 'gathered there by himself.'" (Phytologist ii. 429.) In attempting to conduct Mr. Borrer to the locality, Mr. Wright mistook his way, &c., &c.

420. SAXIFRAGA HIRSUTA, *Linn.*

Hibernian. The result of garden culture, and especially of raising the Irish Saxifrages from seeds, kindly sent to me by Mr. Andrews, seems almost to warrant the union of this and S. Geum, as a single species only. The difficulty is, that while S. hirsuta appears to pass into S. Geum, on one side, it approximates very much towards S. umbrosa on the other.

421. SAXIFRAGA UMBROSA, *Linn.*
421,b. SAXIFRAGA PUNCTATA, *Haw.*
421,c. SAXIFRAGA SERRATIFOLIA, *Mack.*

Area (9 10 11 12 13 14 15).

Alien in Britain? Native Hibernian. The testimony in support of this species being native in Heseltine Gill, near Settle, is so strong that I should have been tempted to treat it as such, if I had been enabled to give the geographical relations here with any approach to accuracy. But, as yet, the locality has been visited only by collectors of specimens; so that I am quite unprepared to state the region, zone, altitude, temperature, or other necessary information for the botanical geographer. If we allow this Saxifrage to be native in Yorkshire, the presumption is increased in favour of some other habitats being also genuine; for instance, those of Taxall, in Cheshire, and Craig-y-barns, in Perthshire. In reference to the Yorkshire locality, Mr. Tatham says, "I consider S. umbrosa really wild here. It is met with in Heseltine Gill, which is a deep ravine, at the foot of Pennighent and Fountains Fell.

There are only two houses in three miles, and those not near the place. Actæa spicata and Ribes petræum grow along with it. The valley runs from west to east, and the Saxifrage is found only on the south side of it, which receives no sunshine, except in summer. Some of the plants are inaccessible, the cliffs are so steep," (Phytologist i, 267). And of the Perthshire locality, we are informed by Mr. Brand, as follows:—"On Craig-y-barns, a hill to the northward of the Park at Dunkeld, covering acres, and, in some places, to the exclusion of every thing else, forming the entire turf. But for the occurrence also of Hypericum calycinum, and other introduced plants, it would have been considered native." (Trans. Bot. Soc. Edinb. i, 25). It must be allowed that the Hypericum and its associates are credible witnesses against the genuineness of the locality of Craig-y-barns; and that the abundance of the Saxifrage there, is so far converted into argument against its nativity elsewhere, howsoever it may have thriven and spread itself.

422. SAXIFRAGA STELLARIS, *Linn.*

Area [1] * * * * * 7 * * 10 11 12 13 14 15 16 17 18.
South limit in Merionethshire and Yorkshire.
North limit in Sutherland and the Hebrides.
Estimate of provinces 10. Estimate of counties 25.
Latitude 52—59. Highland type of distribution.
A. A. regions. Superagrarian—Superarctic zones.
Descends to 200 yards, in North Wales.
Ascends to 1400 or 1450 yards, in East Highlands.
Range of mean annual temperature 45—32.

Native. Uliginal and Rupestral. One of the most generally distributed of our arctic or alpine species; and being still exclusively limited to the mountainous provinces, it is

thus one of the most characteristic examples of the Highland type. I believe to have seen it at the sea level in the West Highlands. Dr. Dickie found one specimen on the summit of Ben-muichk-dhu. Remarkable that it should not be included in the Floras of Shetland and Orkney. I know of no plant "in the fissures of rocks, near Castle Treryn," in Cornwall, which could be mistaken for this Saxifrage, unless it were the Sedum Telephium; and yet the alleged habitat is highly improbable, and not confirmed.

423. SAXIFRAGA NIVALIS, *Linn.*

Area * * * * * * 7 * * * * 12 * * 15 16.
South limit in Caernarvonshire.
North limit in Aberdeenshire and Isle of Skye.
Estimate of provinces 4. Estimate of counties 10.
Latitude 53—58. Highland type of distribution.
Arctic region. Midarctic—Superarctic zones.
Descends to 650 or 700 yards, in East Highlands.
Ascends to 1300 yards or upwards, in same province.
Range of mean annual temperature 40—34.

Native. Rupestral. A local example of the exclusively arctic plants; limited apparently to four provinces, and very scarce in two of them, North Wales and the Lake province. Possibly it may exist also within the limits of Durham, in the province of Tyne; since Mr. James Backhouse reports it as found by himself on High Cup Scar; but whether that station is within Cumberland, Westmoreland, or Durham, is not clearly stated. It is much to be regretted that botanists who report their own local observations, so seldom do this in clearly expressed terms. I have before alluded to the low habitat of this Saxifrage on the Clova mountains (page 42), which is intended by the

altitude of 650 or 700 yards. Its usual position runs between 800 and 1000 yards. On the summit of Ben Lawers, it attains 3900 or 4000 feet.

424. SAXIFRAGA HIRCULUS, *Linn.*

Area * * * * * * * * 9 10 11 12 13 14.
South limit in Cheshire and Yorkshire.
North limit in, or near to, Edinburghshire.
Estimate of provinces 6. Estimate of counties 7.
Latitude 53—56. Scottish type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends to 100 yards, or less, in Mersey province.
Ascends to ——?
Range of mean annual temperature 47—?

Native. Uliginal. Notwithstanding so many good botanists have visited and described the localities of this species, I find myself quite unable even to guess the altitude to which it ascends; and am uninformed of the probable zone or temperature in which it exists. I once sought the plant on Knutsford Moor (by mistake for Knutsford Heath) and can therefore estimate approximately the altitude and temperature to which the plant descends, and that is all. A time is now not far distant, when botanists will visit the localities of plants for some purpose higher in the intellectual scale, than that of merely collecting specimens:—a necessary step in science, no doubt; but frivolous when made into the end, instead of the means of scientific research. Fifty scientific men will learn the facts of nature, simply as facts, for one who will inquire into the relations between facts, or into the adaptations of *this* and *that* in nature.

425. SAXIFRAGA AIZOIDES, *Linn.*

Area * * * * * * * [8 9] 10 11 12 13 * 15 16 17 18.
South limit in Yorkshire and North Lancashire.
North limit in Orkney and Sutherland.
Estimate of provinces 8. Estimate of counties 20.
Latitude 54—60. Highland type of distribution.
A. A. regions. Midagrarian—Superarctic zones.
Descends to the coast level, in the West Lowlands.
Ascends to 1050 yards, in the East Highlands.
Range of mean annual temperature 48—36.

Native. Uliginal and Rupestral. Were we to judge by the analogy of Saxifraga stellaris, Oxyria reniformis, and other of the more frequent Arctic-agrarians, with which the S. aizoides is so usually associated in the Highland provinces, as well as in the north of England, we should confidently expect to find it accompanying the same species in Wales; and yet it is apparently quite absent therefrom. This absence seems the more remarkable, because the S. aizoides is less strictly a mountain plant than the S. stellaris or Oxyria reniformis. We have a somewhat parellel instance in the Alchemilla alpina. The S. aizoides is very scarce in the midagrarian zone; but I feel necessitated to consider it as an inhabitant of that zone, since it was discovered by Dr. P. W. Maclagan, on the coast rocks of Ayrshire. In Cumberland, also, it decends rather below 100 yards, along the streams in the mountain valleys; growing there on a level with plants which I have considered not to rise above the midagrarian zone. In the north of Sutherland, it occurs by road sides, very slightly above the sea level, and not in the immediate vicinity of mountains; for instance, about Tongue. On the eastern side of Scotland,

Dr. Dickie finds it descending the course of the river Dee, even to Aberdeen. Mr. Howard stated (B. G.) that he had received a specimen from Derbyshire; and Blackstone is quoted as an authority for its existence on Beeston Castle, which is out of all credence. But a second Cheshire locality, "on a high hill in Wirsall Town, near Malpas," would seem more probable, were it not made doubtful by being coupled with the evident error of Beeston Castle. For the present, therefore, the provinces of Trent and Mersey are excluded from the admitted area; though sufficiently probable to encourage research in their higher and wilder tracts.

426. SAXIFRAGA OPPOSITIFOLIA, *Linn.*

Area * * * * * * 7 * * 10 * 12 (13) * 15 16 17 18.
South limit in Merionethshire and Yorkshire.
North limit in Shetland, Orkney, Sutherland.
Estimate of provinces 7. Estimate of counties 15.
Latitude 52—61. Highland type of distribution.
A. A. regions. Superagrarian—Superarctic zones.
Descends to the coast level, in West Highlands.
Ascends to 1300 yards, or upwards, in East Highlands.
Range of mean annual temperature 48—34.

Native. Rupestral. Frequent on the Highland mountains; very scarce in England and Wales. Possibly the county census would be nearer to 20 than 15, if we had full lists for all the counties. It would be incompatible with my prescribed limits in this work, were I to enumerate counties, and to explain the grounds on which the census is estimated, for each successive species; but this being one of the instances where I feel uncertain of the choice between two steps in the scale, I will make it also an ex-

ample in explanation of my estimates. I am aware of localities in the counties of Merioncth, Caernarvon, York, Cumberland, Lanark (probably introduced), Stirling, Perth, Forfar, Aberdeen, Moray, Argyle, West Inverness, Ross, Sutherland, Orkney, and Shetland; fifteen in the whole, omitting Lanark. So far, we have positive knowledge, as it is presumed to be. And there seems no improbability in supposing that the same species might be found in some other counties, as those of Dumbarton, Kincardine, Banff, Caithness, and the Hebrides; indeed, I believe that I have seen it in Dumbartonshire, although neglecting to take a note of the fact. Should the species occur in three of these counties only, its census would come nearer 20 than 15; and I have made no step in the series between those two numbers. In the uncertainty, the lower estimate is taken for the present; but if I were informed certainly of the species growing in one or two of the other counties. I should in that case prefer the higher number. The temperature of 48° Fahr. will seem high for this alpine species; but we can scarcely assign a lower temperature for the Mull of Cantire, where Professor Balfour finds this Saxifrage. In more inland places, the annual mean of 48° would be accompanied by a summer temperature too high for S. oppositifolia in a wild state; although, when protected from the encroachments of more vigorously growing plants, it will bear the mean of 48° quite inland. I presume the habitat in Cantire to be at the coast level; and in that of the cliffs by Loch Errboll, in Sutherland, the plant grows only some few feet above the tide level. Dr. Dickie finds it on the sea cliffs, in the north of Aberdeenshire. In Wales, it occurs at 550 yards, and upwards.

427. SAXIFRAGA GRANULATA, *Linn.*

Area * 2 3 4 5 * 7 8 9 10 11 12 13 14 15.
South limit in Dorset and Kent.
North limit in Moray, Aberdeenshire, Lanarkshire.
Estimate of provinces 14. Estimate of counties 40.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends (nearly ?) to the coast level, in the Channel.
Ascends to 200 yards, in the province of the Lakes.
Range of mean annual temperature 50—46.

Native. Glareal and Pascual. Rather a restricted example of the British type; being absent apparently from five provinces. But since it occurs in counties immediately adjoining four of those provinces, I have thought it advisable to take the provincial estimate, one above our recorded knowledge; especially for a species which is too common to have had its localities much investigated and placed on record. It is included in 17 of the 20 Floras, according to the London Catalogue, which gives some probability that 50 counties might not prove an over estimate, although my notes do not show localities in 40 counties, at present.

428. SAXIFRAGA CERNUA, *Linn.*

Area * * * * * * * * * * * * * * * 15.
South and North limits in Perthshire.
Estimate of provinces 1. Estimate of counties 1.
Latitude 56—57. Highland type of distribution.
Arctic Region. Superarctic zone.

Descends to 1250 yards (and lower ?), in East Highlands.

Ascends to 1300 yards, in the same province.

Range of mean annual temperature 35—34.

Native. Rupestral. Extremely local ; being found only near the summit of Ben Lawers, and (according to Hooker and Borrer) on Craigalleach. Unless there is some mistake respecting the latter station, the lower limit may descend to 900 or 1000 yards ; for Craigalleach does not much exceed 1000 yards in height. Though that hill has been much visited, I am unaware of any succeeding botanist having re-found and confirmed the locality for this species; and a mistake might readily be made through mingling specimens of plants collected on adjacent hills.

429. SAXIFRAGA RIVULARIS, *Linn.*

Area * * * * * * * * * * * * * * * 15 16.

South limit in Perthshire and Forfarshire ?

North limit in Moray and West Inverness.

Estimate of provinces 2. Estimate of counties 3.

Latitude 56—58. Highland type of distribution.

Arctic region. Superarctic zone.

Descends to 1100 or 1000 yards, in W. Highlands.

Ascends to 1200 yards, in the same province.

Range of mean annual temperature about 35.

Native. Rupestral. I have seen this species in two of its few localities ; namely, on Ben Nevis, where it grows at 1000 or 1100 yards above the sea, in a spot irrigated, while the plant is in flower, by water trickling from the melting snow shortly above ; also, on the northern declivity of the adjacent Red Cairn Hill, in a spot upon which

the snow probably lies till July, at 1200 yards of elevation. Mr. Don enumerates it among the plants of Forfarshire.

430. SAXIFRAGA TRIDACTYLITES, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 * 14 15 * 17.
South limit in Devon, Isle of Wight, Kent.
North limit in the east of Sutherland and Cromarty.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British type of distribution.
Agragarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 300 yards, in North Wales.
Range of mean annual temperature 51—45.
Native. Glareal and Rupestral. Frequent in England; much less so in Scotland, and apparently absent from the western provinces of that part of Britain; although it may eventually prove that this inconspicuous and early-flowering species has merely been overlooked in the less-examined western side of Scotland. The station of Dunrobin, in Sutherland, is just above the line of 58°.

431. SAXIFRAGA HYPNOIDES, *Linn.*
&c. &c. &c.

Area 1 (2) * * 5 6 7 8 * 10 11 12 13 14 15 16 17 18.
South-east limit in Somerset, Derbyshire, Yorkshire.
North limit in Orkney and Sutherland.
Estimate of provinces 14. Estimate of counties 30.
A. A. regions. Midagrarian—Superarctic zones.
Latitude 51—60. Highland type of distribution.
Descends to the coast level, in the East Highlands.

Ascends to 1300 yards in the same province.

Range of mean annual temperature 47—34.

Native. Rupestral. It is doubtful whether this species would be more fitly referred to the Scottish or to the Highland type. Its decided prevalence among the Highland mountains suggests the latter; while its occurrence in several other spots, distant from hills of a mountainous character, seems to bring it close upon the Scottish or lower boreal type. Very local in the Peninsula, where it is said to grow on the Mendip and Cheddar hills, in Somerset. The habitat of Stour Head, in Dorset, is supposed to have originated from cultivation in gardens. I am unaware of the altitude of the Mendip and Cheddar stations, which may possibly imply a mean temperature as high as 48. It grows below 200 yards in Caernarvonshire. With S. hypnoides, I include all the varieties, deemed species by some botanists, known by the names of platypetala, hirta, affinis, incurvifolia, denudata, elongella, lætevirens, and pygmæa; probably also, the decipiens and muscoides, of English botanists, might be properly referred to S. hypnoides.

SAXIFRAGA MUSCOIDES, *Wulf.*

Area [12].

Incognit. Stated to have been found in Westmoreland. Probably some variety of S. hypnoides was thus named.

432. SAXIFRAGA CÆSPITOSA, *Linn.*

Area * * * * * * [7 8 * * * 12] * * 15 16.

South and North limits in Banff and West Inverness.

Estimate of provinces 2. Estimate of counties 2.
Latitude 56—58. Highland type of distribution.
Arctic region. Superarctic zone.
Descends —— ? (Say, about 1100 yards).
Ascends —— ? (Say, 1200 or 1300 yards).
Range of mean annual temperature, say 34.

Native. Rupestral. Concerning the distribution of this plant, I find myself much at fault, for want of clear information and an accurate knowledge of the species. The Welch and English plants, which pass under name of cæspitosa or decipiens, appear more akin to S. hypnoides than to the specimens of S. cæspitosa, from Ben Avon, for which I was indebted to Mr. Stables and Dr. Barry,—whether collected within the limits of Aberdeen or of Banff, I am not able to say. There appears likelihood that the "S. cæspitosa," found by Mr. Woods, "among the rocks near the summit of Ben Nevis," may also belong to the same species as those from Ben Avon.

433. SAXIFRAGA PEDATIFIDA, *Ehrh.*

Area * * * * * * * * * * * * * * * 15.
South and North limits in Forfarshire.
Estimate of provinces 1. Estimate of counties 1.
Latitude 56—57. Highland type of distribution.
Arctic region. Midarctic zone ?
Descends —— ? (Say, at 800 or 900 yards ?)
Ascends —— ?
Range of mean annual temperature, say 39—38.

Native ? Rupestral. Said to have been found by Mr. Don, on rocks, near the head of Clova. In his account of the botany of Forfarshire, Don says, in his usual vague or careless language, "summits of the Clova Mountains";

but with him the " summits " sometimes mean declivities very far below, and usually intend the rocks at 700 to 800 yards: the actual summits are 1000 yards, or upwards, though there are peaks and ridges of only 800 or 900 yards.

434. CHRYSOSPLENIUM OPPOSITIFOLIUM, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and Sutherland.
Estimate of provinces 18. Estimate of counties 75.
Latitude 50—60. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1100 yards, in the West Highlands.
Range of mean annual temperature 50—36.

Native. Uliginal, &c. None of our terms, used for expressing the situations of growth, will very exactly apply to those of the present species; which, indeed, vary considerably. The usual haunts are on the damp banks of shaded ditches and small streams, in the agrarian region, and at the mossy efflux of springs on the declivities of the mountains, in the arctic region. Doubtful whether 75 or 80 would be nearest to a true county census. As it was not observed in the Hebrides, by Balfour and Babington, and is omitted from the Shetland Flora, as also from that of Cambridgeshire, and from several local lists, it may be that 75 is not too low for an estimate. According to the London Catalogue, it is mentioned in 18 among 20 local Floras; the two from which it is absent, being those of Cambridge and Yarmouth.

435. CHRYSOSPLENIUM ALTERNIFOLIUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15.
South limit in Devon? Dorset? Hants? Kent.
North limit in Moray, Aberdeenshire, Argyleshire?
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends (nearly?) to the coast level, in the Peninsula.
Ascends to 1050 yards, in the East Highlands.
Range of mean annual temperature 49—37.

Native. Uliginal, &c. In damp or wet and shaded places, frequently along with the other species, though much less common, especially towards both the lower and the upper limits; indeed, this is quite rare on the mountains, where C. oppositifolium is abundant. It is remarkable that all the most southern counties indicated for this species, should have been reported on authority scarcely sufficient for reliance, without fresh confirmation, which has not been made in our time. Still, though the question is attached, in the line which indicates the South limits, those counties are not so unlikely as to justify their rejection, from the range of latitude, &c. For Somerset and Surrey, we have good and recent authorities. Type of distribution intermediate between Scottish and British.

436. PARNASSIA PALUSTRIS, *Linn.*

Area * 2 3 4 5 * 7 8 9 10 11 12 13 * 15 16 17 18.
South limit in Dorset, Hants, Surrey, Essex.
North limit in Shetland, Orkney, Sutherland.

Estimate of provinces 16. Estimate of counties 60.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Channel province.
Ascends to 900 yards, in the East Highlands.
Range of mean annual temperature 50—38.

Native. Paludal. Rather frequent, especially in the north of England and Scotland, though not by any means a common plant; and it may be questioned whether 50 or 60 would be the nearest county estimate. My lists, which I do not consider at all complete, show localities in upwards of forty counties. Seldom seen above 600 or 700 yards in the Highlands. The type of distribution inclines to the Scottish. The Parnassia, as must be allowed, is badly associated with Saxifragaceæ; less badly with Hypericaceæ, where it is now placed by Lindley.

437. ADOXA MOSCHATELLINA; *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 * 17.
South limit in Devon, Isle of Wight, Kent.
North limit in Ross, Moray, Aberdeenshire.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
A. A. regions. Inferagrarian—Superarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 1100 yards, in the East Highlands.
Range of mean annual temperature 51—36.

Native. Sylvestral. Rare above the agrarian region; but recorded in the Flora Scotica, as having been observed by Mr. Stuart, "near the top of Craig Challech," near Killin. In 1832, I found it on the rocks just by one of the summits of the Killin Mountains, nearer to Ben Lawers

than that of Craig Chailleach, and which I took to be Mael Grew, or Mael Greadha. I estimated this summit to be 1100 yards in altitude. I have also seen the Adoxa at 600 or 700 yards of elevation in Caernarvonshire. Though I can give no authority for its occurrence in the province of the West Highlands, there would seem every likelihood of its existence there. In Surrey, I find the Adoxa only in shaded dells and woods; but in Devon it is frequent on hedge-banks, as is also the case in the more northern counties.

438. HEDERA HELIX, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Sutherland.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 300 or 350 yards, in the Lake province.
Range of mean annual temperature 52—45.
Native. Sylvestral, Rupestral, &c. Not enumerated in the list of Hebrides plants; but probably found in every other county; and usually in such abundance as to be one of the botanical features of English scenery, particularly in the winter season.

439. CORNUS SANGUINEA, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 * (13 14 15 16).
South limit in Cornwall, Isle of Wight, Kent.

North limit in Durham and Lancashire.

Estimate of provinces 11. Estimate of counties 50.

Latitude 50—55. English type of distribution.

Agrarian region. Inferagraraian —Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 51—47.

Native. Septal and Sylvestral. Very doubtful whether this species is indigenous anywhere in Scotland. In the Flora of Moray and Berwick, it is mentioned only as an introduced shrub. From those of Aberdeen and Glasgow, it is wholly omitted. Single localities are given in those of Edinburgh and Lanark; and these are too dubious for reliance as indigenous habitats. In addition, there is the locality of Strathearn, on the authority of Dr. Arnott, in the Flora Scotica. Frequent in the more southern provinces of England.

440. Cornus suecica, *Linn.*

Area * * * * * * * * * 10 11 * * [14] 15 16 17.

South limit in Yorkshire.

North limit in Sutherland.

Estimate of provinces 5. Estimate of counties 12.

Latitude 54—59. Highland type of distribution.

A. A. regions. Superagrarian—Midarctic zones.

Descends to 300 yards, in the North Highlands.

Ascends to 950 yards, in the West Highlands.

Range of mean annual temperature 42—37.

Native. Uliginal and Ericetal. More a frequent than a scarce plant in the two lower arctic zones of the Highland mountains; scarcely descending within the agrarian region. Southwards from the Highlands, it reappears on the moun-

tain of Cheviot, and in the Hole of Horcum, in the east of Yorkshire. It is thus a striking exception to almost all the other examples of the Highland type. Such of them as occur also in England, being found on the higher mountains of the Lake province and North Wales, or those in the West of Yorkshire and Durham. The mean temperature of the Yorkshire locality is probably several degrees above 42°, and the altitude lower than 300 yards; but I find no clear information on these points, and therefore the altitude and temperature are indicated from the Scottish distribution.

441. HYDROCOTYLE VULGARIS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 350 or 400 yards, in the Lake province.
Range of mean annual temperature 52—44.

Native. Uliginal. Perhaps this plant may be rare among the Highland mountains; although frequent in the low grounds of those and other provinces. But with regard to a plant so easily overlooked, the non-appearance of its name among my notes on the altitudes of plants in the Highlands, is not conclusive evidence against its being there. As it is said to be common in Shetland, we might anticipate its occurrence to some hundreds of yards of elevation in the Highlands.

442. SANICULA EUROPÆA, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16 17.
South limit in Devon, Isle of Wight, Kent.
North limit in Sutherland, Nairn, Dumbarton shires.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—59. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 300 or 350 yards, in the East Highlands.
Range of mean annual temperature 50—44.
Native. Sylvestral. It may be that the county census would rise nearer to 80 than to 75, if completely ascertained.

443. ASTRANTIA MAJOR, *Linn.*

Area (5).
Alien ? In Shropshire and Herefordshire. "This plant was, in 1840, discovered by Mr. Dl. Sharpe, in the wood above Stokesay Castle, Shropshire, 'in plenty.' Mr. Borrer this summer (1841) examined the wood, which is extensive, and found four large patches of it along the little-frequented path at the upper edge of the wood, and one a little off from the path, near one of the four. It had every appearance of being quite wild, and the locality did not favour the idea of an accidental escape from cultivation." (W. A. Leighton, in Phytologist i, 111). "Between Whitbourne and Malvern. Above Stokesay Castle, near Ludlow. Mr. Borrer has seen it in the latter place, and considers it to have been introduced 'ages ago.'" (Bab. Man.).

444. ERYNGIUM MARITIMUM, *Linn.*

Area 1 2 3 4 * 6 7 * 9 10 11 12 13 14 15 16 * 18.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Forfarshire, Argyleshire.
Estimate of provinces 16., Estimate of counties 30.
Latitude 50—57 and 61. British (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends almost to the coast level, in the Peninsula.
Ascends, on the coast level, to the North Isles.
Range of mean annual temperature 52—47.

Native. Littoral. This species apparently finds its north limit on the more southern coasts of the Highland provinces, but re-appears on the shores of Shetland; a peculiarity possibly connected with the high winter temperature of those isles. Nevertheless, the scarcity of the plant on the coasts of Scotland, and its prevalence on those of England, give much of the English type to its distribution; even though attaining to the high latitude of Shetland.

445. ERYNGIUM CAMPESTRE, *Linn.*

Area (1 * * [4 * * * * 9 10] 11).

Alien? Still found near Plymouth, and on the banks of the Tyne; and the plants at these distant habitats appear to belong to the same species; but I have not seen the radical leaves of the Plymouth plant. Until recently, it grew also at Watling Street, by Brookhall, near Daventry; where the last specimens were collected in 1834, according to Mr. Anderson. "Melling, in Yorkshire," has also been recorded as a locality for the same species; though probably by

some mistake, both of plant and county. Hooker marks E. campestre as an introduced species; Babington allows it to be a native; and in Henslow's Catalogue, also, it has the same title or privilege awarded to it. Perhaps, we might safely treat it as a denizen; though it is likely to become reduced to its two localities in the province of Tyne. These are described thus, by my valued botanical correspondent, Mr. Storey;—"There are but two stations for E. campestre, on the Durham side of the Tyne. One is at the eastern extremity of Jarrow ballast hills; the other at the Salt-meadows, near Friar's Goose. The plant is found in great abundance in both stations, which may be about five miles apart." (Nov. 1843).

446. CONIUM MACULATUM, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Hebrides, Sutherland.
Estimate of provinces 18. Estimate of counties 81.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Viatical and Septal. Generally distributed, as is evident from the above epitome of its area, &c.; but it is not one of our commonest species. I have seen a plant of the Conium eleven feet high, growing close by the side of a stream, in Surrey; so that a humid situation would seem more suitable for the species than the dry hedge-banks, on which it often occurs.

447. PHYSOSPERMUM CORNUBIENSE, *De C.*

Area 1.
South limit in Cornwall.
North limit in Devon.
Estimate of provinces 1. Estimate of counties 2.
Latitude 50—51. Local or Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to 50 or 100 yards, in the Peninsula.
Ascends to 100 yards, more or less, in same province.
Range of mean annual temperature about 50.

Native. Sylvestral and Septal. A very local species, which was long believed to be restricted to the neighbourhood of Bodmin, in Cornwall. Lately it has been discovered also in Devon, by the Rev. W. S. Hore, who found it in an oak coppice, near Tavistock, about a quarter of a mile from New Bridge.

448. SMYRNIUM OLUSATRUM, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 * 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit about Dumbarton, Stirling, and coast of Fife.
Estimate of provinces 16. Estimate of counties 40.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—47.

Denizen? Sub-littoral and Viatical. Many of the localities, on record for this plant, are in the immediate

neighbourhood of old castles, ruins of religious houses, and such spots as can scarcely fail to awaken some suspicion that its present existence there may have been owing to former cultivation. But besides these localities, there are others on cliffs, and in neglected nooks near the sea shores, which assume more of a natural aspect. I am disposed to consider it native in the more southerly provinces, but only naturalized in Scotland and the northern provinces of England.

449. CICUTA VIROSA, *Linn.*

Area 1 * 3 4 5 * * 8 9 10 11 12 13 14 15 16.
South limit in Somerset, Surrey, Kent.
North limit in Forfarshire and Dumbartonshire.
Estimate of provinces 14. Estimate of counties 30.
Latitude 51—57. British type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 50—47.

Native. Paludal. Almost too partial in its area, and too low in its census, to be fairly referrible to the British type, and yet nearer to that type than to any other. It is somewhat remarkable for a person who has collected plants in so many different and distant counties, that I should have never yet seen this species in a living state; my herbarium being indebted to other botanists for all the examples of the present species, which are contained therein. If, therefore, I should trust to my own individual experience, it would be entered as one among our rarest plants; and yet, such is not the case. This is a decided instance of the inadequacy of individual experience, as a test of the rarity and frequency of plants.

450. APIUM GRAVEOLENS, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 (15) 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Argyleshire (and Aberdeenshire?)
Estimate of provinces 15. Estimate of counties 30.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends, on the coast level, to the West or East Highlands.
Range of mean annual temperature 52—48:

Native. Littoral. Frequent on the coasts of England, and in some few spots inland, where the waters are impregnated with salt, as at Droitwich and Snodsbury. Also occurs occasionally in damp places, and by road sides, as a straggler introduced through cultivation. There appears some uncertainty about the locality quoted in the Flora Abredonensis ("Near the Craiglug. Dr. Murray"), and it is expressly marked as an introduced plant in the Collectanea for Moray, I have therefore deemed it advisable to omit the East Highland province from its area and census, and to restrict the range of latitude in accordance. Professor Balfour finds it in Cantire, a part of the West Highland province, but in the latitude and climate of the Lowlands.

451. PETROSELINUM SATIVUM. *Hoffm.*

Area (1 2 * * * * * * * * 11 * 13 14 15 16).

Alien. Universally cultivated in gardens, and occasionally seen as a weed about road sides and rubbish heaps, both in England and Scotland; but scarcely acquires any

permanent habitat, unless it be on cliffs along the coasts, where it may be found in various spots, from the south coasts of England northward to those of the Firth of Forth; even to Skye, according to Lightfoot. On some parts of the southern coasts, indeed, as those of Devon, it might fairly be considered a naturalized plant. Not having kept full notes of its localities, as seen or read, I am unprepared to specify its provincial area by the proper numerals; but if we will accept those localities in which it is only an occasional and temporary straggler from cultivation, doubtless we may include all the 16 provinces within its area.

452. PETROSELINUM SEGETUM, *Koch*.

Area 1 2 3 4 5 * * * * * [10 * * * * * 16].
South limit in Devon, Isle of Wight, Kent.
North limit in Norfolk, Warwickshire, Worcestershire.
Estimate of provinces 5. Estimate of counties 20.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—48.

Native. Septal, &c. Said to be "common" near Hull, on the authority of the Rev. J. Dalton, in the Botanist's Guide; a locality which should be verified before the area and range of the species can be extended so far northward of its other habitats. That of a "grass field in the island of Tirey," reported in Flora Scotica, on the authority of Dr. Walker, is doubtless an error. Sison Amomum and Pimpinella Saxifraga occur plentifully about a Surrey locality, reported for the present species, which I sought there unsuccessfully. The Sison may have been mistaken for it, in

the neighbourhood of Hull; and the Pimpinella is a plant very likely to grow in a grass field in Tiree or Tirey. Indeed, I have received the Pimpinella from another locality, in Surrey, with the name of "Petroselinum segetum" on its label; so that the mistake of one for the other, seems probable enough elsewhere.

453. TRINIA GLABERRIMA, *Hoffm.*

Area 1 * * * 5 * [7 * * * * 12].
South limit in Devon (Rev. W. S. Hore).
North limit in Gloucestershire (Mr. Thwaites).
Estimate of provinces 2. Estimate of counties 3.
Latitude 50—52. Local or Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends nearly or quite to the coast level.
Ascends, probably, little above the coast level.
Range of mean annual temperature 52—50.

Native. Rupestral. Very local; occurring at Berry Head, in Devon; at Uphill and Worle Hill, in Somerset; also on St. Vincent's Rocks, on the Gloucestershire side of the Avon, near Bristol. It is likewise reported from Herefordshire, on the faith of Duncumb's History; from the Rocks of Llandudno, in Caernarvonshire, on the authority of Mr. Griffith; from Keswick, on the credit of Hutton, a lake guide. Perhaps the Llandudno habitat may be worth looking for; in the other two probably Pimpinella Saxifraga was intended.

454. HELOSCIADIUM NODIFLORUM, *Koch.*
454,b. HELOSCIADIUM REPENS, *Koch.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 [15] 16.
South limit in Cornwall, Isle of Wight, Kent.

North limit in Haddingtonshire and Argyleshire.
Estimate of provinces 15. Estimate of counties 60.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level; in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—48.

Native. Paludal. Whether or not we have a second species in this county, distinct from H. nodiflorum, I am quite satisfied that most of the specimens labelled as "H. repens," are simply varieties of the H. nodiflorum. But a Suffolk specimen, for which I was indebted to Mr. Paget, presents such difference of habit, as to induce some degree of doubt respecting its identity with the common English species. The numeral which corresponds with the East Highland province [15], is enclosed in the line of Area, owing to an uncertainty about a locality for H. repens, which was placed under the county of Aberdeen, in the New Guide; namely, "side of the river Fergus, a little above the Bridge of Ennis" (Hook. Scot.).

455. HELOSCIADIUM INUNDATUM, *Koch.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Ross, Moray, Argyleshire.
Estimate of provinces 18. Estimate of counties 70.
Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 250 yards, in Scotland.
Range of mean annual temperature 51—44.

Native. Lacustral and Uliginal. Almost general in its

area and census; but being an inconspicuous plant, it is frequently overlooked, and consequently is supposed to be more rare than is the fact. I have noted it as observed at Pitmain, in Moray, which is supposed to be over 700 feet above the sea, and to have a mean temperature of 44° or less.

456. SISON AMOMUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * * 14.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Cheshire and Berwickshire.
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.
Native. Septal, &c. Frequent in the more southerly provinces of England; becoming scarce in the northern; and apparently restricted to a single county in Scotland. Is it truly indigenous in Berwickshire?

457. ÆGOPODIUM PODAGRARIA, *Linn.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 13 14 15 16 * (18).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray, Aberdeenshire, Dumbartonshire.
Estimate of provinces 16. Estimate of counties 70.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.

Ascends to 150 yards, in the East Highlands.

Range of mean annual temperature 51—45.

Native? Viatical. The nativity of this plant is somewhat questionable, generally and plentifully as it is nevertheless now distributed. It was formerly in repute as a medicinal herb, and most of its habitats, especially the more northerly, are in the immediate vicinity of houses or ecclesiastical buildings. Yet it is now so thoroughly established, as an English (if not also as a Scottish) weed, that the native designation appears to be more appropriate than that of denizen. Dr. Neill observed it near Kirkwall, in Orkney, where it may have been introduced. The Rev. G. Gordon deems it a doubtful native in Moray. In the Flora of Aberdeen it is admitted as an undisputed native, and indicated to be "common" in that neighbourhood. I have seen it in several spots near the south side of the Highland provinces, as at Stirling, Lochearnhead, Killin, and between Newtyle and Coupar; but all of these stations may be considered suspicious when a suspected species is under consideration. In Surrey, though still keeping to the neighbourhood of houses, it has almost as much of a native look as the Verbena officinalis or Urtica dioica.

458. CARUM CARUI, *Linn.*

Area (* 2 * 4 5 * * 8 9 10 11 12 13 14 15 * 17 18).

Alien? There can be no doubt that this is merely a straggler from cultivation, in nearly all of the provinces indicated above by their numerals. But in Lincolnshire and Yorkshire, it would seem to have become perfectly established; if not truly native there. Teesdale wrote, "Meadows adjoining the Humber, near Hull, so plenti-

fully that the poor people gather the seed to dispose of to the druggists."

459. CARUM VERTICILLATUM, *Koch.*

Area [1] * * * * 6 7 * * * * 12 13 * * 16.
South limit in Pembrokeshire and Glamorganshire.
North limit in Argyleshire and Dumbartonshire.
Estimate of provinces 5. Estimate of counties 15.
Latitude 51—57. Atlantic type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends probably to the coast level, in South Wales.
Ascends to 100 or 200 yards, in North Wales.
Range of mean annual temperature 49—46.

Native. Pratal. In its area this plant is peculiarly western; and yet it differs from other species referred to the Atlantic type, by not occurring in the Peninsula; for the alleged locality, near Moreton, in Devonshire, on the authority of Mr. Weston, requires verification. It may be held one of the connecting links between the Atlantic and Highland types; widely different as those types are in general. Dr. Robert Graham observed it "some way up the Ben More, in Cowal," Argyleshire; and it may be 200 yards, or upwards, above the sea, in some of its Caernarvonshire localities.

460. BUNIUM FLEXUOSUM, *With.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney and ———— ?
Estimate of provinces 18. Estimate of counties 80.

Latitude 50—60. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 450 yards, in the East Highlands.
Range of mean annual temperature 51—42.

Native. Sylvestral and Pratal. Wanting in the lists for Shetland and Hebrides; nor did I note it as seen in Sutherland or Caithness. Dr. Gillies found it in Orkney; and the Rev. George Gordon records it from Ross, and very commonly in Moray.

461. BUNIUM BULBOCASTANUM, *Linn.*

Area * * 3 4.
South limit in Middlesex or Hertfordshire.
North limit in Cambridgeshire and Bedfordshire.
Estimate of provinces 2. Estimate of counties 4.
Latitude 51—53. Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends —— ?
Ascends —— ? (Say, 50 or 100 yards.)
Range of mean annual temperature about 48.

Native. Pratal? I presume this to be the "Bulbocastanum majus," mentioned by Dillenius, as having been found "in a field between Hornsey Wood and Old Fall, near the foot-path." It was, however, discarded by most of our late authors until re-discovered by the Rev. W. H. Coleman, who has been so successful in detecting new plants or new localities for very local plants. As yet, it is reported only from the four counties, mentioned for its south and north limits; to which one or two more might perhaps have been safely added in the estimate.

462. PIMPINELLA SAXIFRAGA, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Sutherland and ———— ?
Estimate of provinces 18. Estimate of counties 80.
Latitude 50—59. British type of distribution.
A. A. regions. Inferagrarian—Inferarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 650 or 700 yards, in North Wales.
Range of mean annual temperature 52—41.

Native. Pascual. Although I do not find the name of this species in the lists for Shetland, Orkney, or the Hebrides, it seems sufficiently likely to occur in the latter group of isles, if not in the others also, to justify the addition of that group to the estimated provincial and comital census. This plant grows on the summit of Craig Koynach, near Castletown, in Aberdeenshire, which exceeds 1700 feet in altitude; also at 2000 feet, or upwards, in Caernarvonshire. It is thus one of the few umbelliferous plants which ascend into our arctic region.

463. PIMPINELLA MAGNA, *Linn.*

Area 1 2 3 4 5 * * 8 [9] 10 11 * * [14].
South limit in Devon, Dorset, (Sussex ?), Kent.
North limit in Durham and ———— ?
Estimate of provinces 8. Estimate of counties 25.
Latitude 50—55. Germanic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.

Ascends to 150 or 200 yards, in the Trent province.

Range of mean annual temperature 50—47.

Native. Septal, &c. An eastern and inland species, which occurs in few of the western counties, and there sparingly. The province of the Mersey requires verification, because resting only on indifferent or uncertain authority. The Edinburgh Catalogue does not recognize it as a plant of that district. The late Mr. Edmondston, however, published it as a plant of that neighbourhood, in the Phytologist, i. 406; but there can be scarcely a doubt that he mistook P. Saxifraga, or something else, for the present species.

464. SIUM LATIFOLIUM, *Linn.*

Area 1 2 3 4 5 * 7 8 * 10 11 12 * 14 15.

South limit in Dorset, Hants, Sussex, Kent.

North limit in Stirlingshire and Haddingtonshire.

Estimate of provinces 12. Estimate of counties 30.

Latitude 50—56. English type of distribution.

Agrarian region. Inferagrarian—Midagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 50 or 100 yards, in England.

Range of mean annual temperature 50—47.

Native. Paludal. Reported in about 30 counties; and it may be that the estimate of 40 would be too high. Apparently very scarce in Scotland; being recorded only from the counties of Haddington and Edinburgh, and the south of Stirling. The Lake province requires verification. Luxuriant examples of S. angustifolium are occasionally mistaken for specimens of S. latifolium. Perhaps the type of distribution may be more Germanic than English.

465. SIUM ANGUSTIFOLIUM, *Linn.*

Area 1 2 3 4 5 6 * 8 9 10 11 * 13 14 15 * * [18].
South limit in Devon, Isle of Wight, Kent.
North limit in Forfarshire and Dumfriesshire.
Estimate of provinces 14. Estimate of counties 40.
Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Paludal. Not a common plant; although sufficiently frequent in the Floras, to have been classed above the rarer species. It is certainly a very scarce plant in the northern provinces; and hence I have not ventured to admit the Orkney Isles within its area, although reported as "common" there, on so good an authority as Dr. Neill. Mr. Croall collected it "near Old Montrose" in the East Highlands. These two are my only authorities for the existence of this species northward of the Forth.

466. BUPLEURUM TENUISSIMUM, *Linn.*

Area 1 2 3 4 5 * * 8 * * 11.
South limit in Dorset, Isle of Wight, Kent.
North limit in Durham, Lincolnshire, Worcestershire.
Estimate of provinces 7. Estimate of counties 15.
Latitude 50—55. Germanic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Channel.
Ascends to 50 or 100 yards, in England.

Range of mean annual temperature 51—47.

Native. Paludal, &c. Rather variable in situation for so local a plant; apparently most affecting salt marshes and the vicinity of the coast; but occurring also in fields and on commons more inland. Possibly the estimate of 20 might have been nearer the truth than that of 15; the species being recorded from 14 counties in the New Guide.

467. BUPLEURUM ARISTATUM, *Barth.*

Area 1.

South and North limit in Devon.

Estimate of provinces 1. Estimate of counties 1.

Latidude 50—51. Local or Atlantic type of distribution.

Agrarian region. Inferagrarian zone.

Descends— ?

Ascends— ? (Altitude trifling).

Range of mean annual temperature 52 or 51.

Native. Rupestral? "On rocks at Torquay," "on the Flagstaff Hill." It is stated to be truly wild there, although periodical in its appearance.

468. BUPLEURUM FALCATUM, *Linn.*

Area (* * 3).

Alien? "The exact station for this plant" was carefully described by Dr. Bromfield, in the Magazine of Natural History, ninth volume, page 87; whence it was copied into the New Botanist's Guide. Is the plant native there, or the contrary?

469. BUPLEURUM ROTUNDIFOLIUM, *Linn.*

Area 1 2 3 4 5 * * 8 * 10 11.
South limit in Dorset, Isle of Wight, Kent.
North limit in Durham, Worcestershire, Somerset.
Estimate of provinces 8. Estimate of counties 25.
Latitude 50—55. Germanic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Channel province.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—48.
Colonist. Agrestal. In all likelihood introduced to this country by cultivation, along with corn or other seeds; now apparently well established.

470. ŒNANTHE FISTULOSA, *Linn.*

Area 1 2 3 4 5 6 * 8 9 10 11 * 13 14 15 16.
South limit in Devon, Isle of Wight, Kent.
North limit in Moray, Forfarshire, Dumbartonshire.
Estimate of provinces 16. Estimate of counties 60.
Latitude 50—58. English (?) type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.
Native. Paludal. Although the area and the range of latitude and zone are here made wide, yet this species has been hitherto recorded from so few Scottish localities, while it is of frequent occurrence in England, that it has appeared better to refer the plant to the English, rather than to the British type of distribution.

†. ŒNANTHE PIMPINELLOIDES, *Linn.*

Area * 2 * * 5.
South limit in Devon, Dorset, Isle of Wight.
North limit in Worcestershire and —— ?
Estimate of provinces 4. Estimate of counties 8.
Latitude 50—53. Atlantic or English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Channel.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 51—48.

Native. Pascual. This species has been almost inextricably confused in books, with the Œnanthe Lachenalii (the Œ. pimpinelloides of *Smith*, not *Linn.*). I can locate it at present, only in the counties of Worcester, Gloucester, Devon, Dorset, and Isle of Wight; from which I have seen specimens. Any other localities beyond those counties, recorded for "Œ. pimpinelloides," I consider much more likely to produce the other species only. But the high probability that this present species will yet be ascertained in some other than the five counties mentioned, induces the slightly higher census above given. (See Phytol. ii, page 12, &c., &c.).

471. ŒNANTHE LACHENALII, *Gmel.*
ŒNANTHE PIMPINELLOIDES, *Smith.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 * 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Haddington, Dumbarton, Argyle shires.
Estimate of provinces 15. Estimate of counties 50.
North limit in Leicester, Worcester, and Cambridgeshire ?

Latitude 50—57. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Paludal. As observed under the preceding species, there has been much error respecting the present one; Hudson and Smith having unfortunately described it under the name of "pimpinelloides," as though it were the species intended under that name by Linnæus. And, indeed, I am more than half inclined to refer one of the three specimens in the Linnean Herbarium to this present species, while the other two assuredly belong to the preceding. As British authors, until the publication of Babington's Manual, continued to use the name of "pimpinelloides" for this species, I refer all localities, published under the latter name, to the present species, with the exception of those from which I have seen examples of the preceding species—the Linnean pimpinelloides. Hither, also, must be referred many of the localities published for the Œ. silaifolia (peucedanifolia of Smith—not Poll.), for which scarcer species this present one has likewise been mistaken in several places. Nor are these two other species of the same genus the only plants which have been confused with this present one: several habitats recorded for Peucedanum palustre, and P. officinale, I have no doubt, will also be found to belong to our present plant.

472. ŒNANTHE SILAIFOLIA, *Bieb.*?
ŒNANTHE PEUCEDANIFOLIA, *Smith.*

Area [1] 2 3 4 5 [6 7] 8 * [10 11 * 13].
South limit in Sussex and Gloucestershire.

Estimate of provinces 6. Estimate of counties 10.
Latitude 50—53. English type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Channel.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 50—48.

Native. Paludal or Pratal. I have seen specimens from the counties of Sussex, Surrey, Bedford, Cambridge (?), Gloucester, Worcester, and Leicester; some doubt attaching to the single Cambridge example, on account of its immature stage of growth. The census is estimated above our ascertained knowledge, because we are yet so insufficiently informed on the subject. Many provinces are enclosed for exclusion, since the published habitats are now supposed (or certainly known) to belong to Lachenalii, instead of the present species.

473. ŒNANTHE CROCATA, *Linn.*
ŒNANTHE APIIFOLIA, *Brit. Flo.*

Area 1 2 3 4 5 6 7 * 9 10 11 12 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray, Aberdeenshire, Argyleshire.
Estimate of provinces 16. Estimate of counties 50.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Paludal. Being omitted from five out of twenty of our local Floras, apparently quite absent from the two most northern provinces, and possibly also, from that of the Trent, I have not ventured to give this species a higher

census than 50 counties; and yet it may be that 60 would prove nearer the reality. I am not prepared to specify localities in so many as 40; but the plant occurs too frequently in England, to have had its localities very carefully observed and recorded.

474. ŒNANTHE PHELLANDRIUM, *Spr.*

Area 1 2 3 4 5 * 7 8 9 10 11 12 * 14 * [16].
South limit in Devon, Hants, Kent.
North limit in Edinburghshire, [and West Inverness ?].
Estimate of provinces 13. Estimate of counties 40.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 50—47.

Native. Paludal. I am indebted to Mr. Churchill Babington for notes of two localities in the West Highlands, namely, Arisaig and Gare Loch. Nevertheless, I have hesitated to take that province into the area, because no other botanist appears to have observed this species in the west of Scotland, and it is very scarce in the east. Both South Wales and Western Scotland, however, appear sufficiently likely habitats to justify the addition of one province in the estimate. The number of counties is probably between 30 and 40.

474,b. ŒNANTHE FLUVIATILIS, *Colem.*

Area * * 3 4.
South limit in Kent and —— ?

North limit in Suffolk and —— ?
Estimate of provinces — ? Estimate of counties — ?
Latitude 51—52. Germanic ? type of distribution.
Agrarian region. Inferagrarian zone.
Descends —— ? Ascends —— ? (Altitude trifling).
Range of mean annual temperature 49—48.

Native. Lacustral or Paludal. As Mr. Coleman, who first directed our attention to this plant, has evinced far more talent for accurate discrimination of species, than desire to make them on slight characters; and as this really appears to have very obvious differences from the ordinary states of Phellandrium, I here treat it as a true species, although so little prepared to illustrate its distribution properly. The counties of Kent, Hertford, Essex, Suffolk, and probably Cambridge, have been indicated for it. Mr. C. C. Babington says, "Mr. Borrer has observed Œnanthe fluviatilis in several parts of England, and when a young botanist, and unacquainted with Cicuta virosa, he mistook it in a young state for that plant; and it is published on his authority, as such, as growing at Canterbury and Ashford, in Turner and Dillwyn's Botanist's Guide. I have seen what I believe to be the same plant, but without flowers, in a brook at Cherry Hinton, and in the river Cam, at Cambridge." (Annals, 1844, vol. 13. page 190).

475. ÆTHUSA CYNAPIUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 * * (18).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray, Aberdeenshire, Glasgow.
Estimate of provinces 16. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 52—47.

Native. Agrestal. The Rev. G. Gordon marks this plant as a doubtful native of Moray, and that being the only other habitat northward of Aberdeenshire, in my notes and compilations, I think it better to enclose Dr. Neill's locality of "Kitchen Gardens, Kirkwall," represented by the numeral (18) of the North Highlands.

476. FŒNICULUM VULGARE, *Gært.*

Area 1 2 3 4 (5) * 7 (8 * 10 11 12 * * 15).

South limit in Cornwall, Isle of Wight, Kent.

North limit in Anglesea, Caernarvonshire, Suffolk.

Estimate of provinces 6. Estimate of counties 12.

Latitude 50—54. English type of distribution.

Agrarian region. Inferagrarian zone.

Descends to the coast level, in the Peninsula.

Ascends, on the coast level, to North Wales.

Range of mean annual temperature 52—49.

Native? Rupestral and Sub-littoral. Admitted for a native by Hooker, Henslow, and Babington; and it has quite the appearance of being truly so on rocks along the coast, although the inland stations are chiefly, if not solely, the results of frequent cultivation. According to Don, it grows on the Sidla Hills. In the New Guide, Dr. Dickie's 'Catalogue' is quoted as the authority for its occurrence in the vicinity of Aberdeen; but having been omitted from the Flora Abredonensis, by the same author, there is probably some error in the Guide.

477. SESELI LIBANOTIS, *Koch.*

Area * 2 3 4 * * * * * * * [12].
South limit in Sussex.
North limit in Cambridgeshire.
Estimate of provinces 3. Estimate of counties 4.
Latitude 50—53. Local or Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Channel province.
Ascends to 50 or 100 yards, in Thames province.
Range of mean annual temperature 51—48.

Native. Rupestral. Occurs in the counties of Sussex, Hertford, Cambridge, and, perhaps, Buckingham; the latter county being vaguely indicated by the habitat "between St. Albans and Stoney Stratford." The name occurs in Hutton's list of plants collected about Keswick, in Cumberland. It was long supposed peculiar to a small tract between the rivers Ouse and Thames, until the Rev. W. H. Coleman detected it in Sussex.

478. LIGUSTICUM SCOTICUM, *Linn.*

Area * * * * * * * * * * 11 * 13 14 15 16 17 18.
South limit in Northumberland and Ayrshire.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 7. Estimate of counties 20.
Latitude 55—61. Scottish type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends to the coast level, in the province of Tyne.
Ascends, on the coast level, to the North Isles.
Range of mean annual temperature 48—46.

Native. Littoral. A complete example of the Scottish type; of which there are very few maritime and umbelliferous plants.

479. SILAUS PRATENSIS, *Bess.*

Area 1 2 3 4 5 * 7 8 9 10 11 * * 14.
South limit in Devon, Isle of Wight, Kent.
North limit in Edinburghshire or Haddingtonshire.
Estimate of provinces 12. Estimate of counties 40.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 150 or 200 yards, in England.
Range of mean annual temperature 51—47.
Native. Pratal and Pascual. Apparently scarce along the western coasts; but not so completely an eastern plant as to fully warrant the assignment of it to the Germanic type of distribution.

480. MEUM ATHAMANTICUM, *Jacq.*

Area * * * * * * 7 * 9 10 11 12 13 14 15 16.
South limit in Merionethshire, Lancashire, Yorkshire.
North limit in Moray, Aberdeenshire, Dumbartonshire.
Estimate of provinces 9. Estimate of counties 20.
Latitude 52—58. Scottish type of distribution.
Agrarian region. Midagrarian—Superagrarian zones.
Descends nearly to coast level, in the Highland provinces.
Ascends to 450 or 500 yards, in the East Highlands.
Range of mean annual temperature 47—42.
Native. Pascual. As this plant grows in an open si-

tuation not much above the level of Keswick (which is less than 100 yards above the sea), and as some of the other English habitats have apparently only a trifling elevation, I have considered it to descend within the limits of the midagrarian zone; although it is more properly a plant of the superagrarian zone. The county of Lancaster requires to be verified by some good modern authority.

481. CRITHMUM MARITIMUM, *Linn.*

Area 1 2 3 [4] * 6 7 * * * [11] 12 13 [14].
South limit in Cornwall, Isle of Wight, Kent.
North limit in Ayrshire and (at present) Kent.
Estimate of provinces 7. Estimate of counties 15.
Latitude 50—56. Atlantic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends, at the coast level, to the West-Lowlands.
Range of mean annual temperature 52—48.

Native. Littoral. At the present time this plant is found only on the southern and western coasts; but it has been reported also from the neighbourhood of Yarmouth, in the province of Ouse (Mr. Wigg, 1781); from the rocks near Alemouth, in the province of Tyne (Wallis,—sought unsuccessfully by Winch); and from the Isles in the Firth of Forth, where it cannot now be found. I suspect that errors occasionally arise, through the English name of this plant, "Samphire," being also applied to Salicornia herbacea. I have known the most curious mistakes occur, through translations of vernacular names into the wrong botanical names, where there was similarly the choice between two. An Arum has been published under the name of Dioscorea; Vaccinium Vitis-Idæa, under that of Vac-

cinium Oxycoccos:—the former, through a mistranslation of the word "Yam"; the latter, through the like error respecting "Cranberries."

482. ANGELICA SYLVESTRIS, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.
Ascends to 850 or 900 yards, in the East Highlands.
Range of mean annual temperature 52—39.

Native. Sylvestral, &c. This and the Heracleum are the two most widely distributed species of their order, with us. Other plants may be as widely and generally distributed in the lower zones of the agrarian region; but none of those ascend so much among the mountains also. Grows in wet and shaded places, so that it may stand either as a Paludal, or as a Sylvestral and Septal.

ARCHANGELICA OFFICINALIS, *Hoffm.*

Area [* * 3 4 5 * * 8 * * 11].

Incognit. I have not been able to see a British specimen of this species, and there is only a poor garden example (of it?) preserved in Smith's herbarium. Through cultivation, it may have occurred in time past, in the vicinity of London, as recorded; but the alleged habitats in the other provinces, beyond that of the Thames, were more likely errors respecting the species seen.

483. PEUCEDANUM OFFICINALE, *Linn.*

Area [* 2] 3 [4 * * * 8].
South limit in Kent.
North limit in Essex.
Estimate of provinces 1. Estimate of counties 2.
Latitude 51—52. Local or Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level.
Ascends, — only at the coast level.
Range of mean annual temperature 50 or 49.
Native. Littoral. An extremely local plant, known only in the two counties above mentioned. In those of Sussex and Norfolk, it is highly probable that Œnanthe Lachenalii was mistaken for this plant; and such may have been the case also, in those of Nottingham and Leicester.

484. PEUCEDANUM PALUSTRE, *Mœnch.*

Area [1 * 3] 4 [5 * *] 8 [9] 10 [* 12 13 14].
South limit in Suffolk, Cambridgeshire, Huntingdonshire.
North limit in Yorkshire and Lincolnshire.
Estimate of provinces 3. Estimate of counties 6.
Latitude 52—54. Germanic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Ouse province.
Ascends to 50 yards, more or less, in the same province.
Range of mean annual temperature 49—48.
Native. Paludal. In rejecting 7 out of 10 provinces in which habitats for the present species have been pub-

lished, it may appear that I am assuming too many mistakes on the part of other botanists. This may turn out to be the case in respect of some of the provinces; and yet the probability appears so strong that Œnanthe Lachenalii and Silaus pratensis have been mistaken for the present species, in most or all of those which are excluded from the area, that it seemed better to reject than to accept them until verified. I have, however, allowed the province of Trent to remain uninclosed, on the unconfirmed authority of Sir Joseph Banks. That of the Peninsula stands on good authority (namely, the Rev. J. C. Collins); and it would have been accepted, but for the circumstance of Œnanthe Lachenalii having only become clearly understood by British botanists several years later than the date of Mr. Collins's record of the Peucedanum, in Burtle Turf Moor, Somerset. Which of the two plants grows there?

485. PEUCEDANUM OSTRUTHIUM, *Koch.*

Area (* * * * * * * * 9 10 11 12 13 14 15 16).

Alien? Much difference of opinion has been expressed by botanists, in respect to the civil claims of this species. Hooker marks it introduced; Babington places it among those possibly introduced, though now apparently native; while Henslow allows it to pass unquestioned, as a native. The majority appears against receiving it for a true Briton. Perhaps, it might fairly be admitted to the category of 'denizens,' for the provinces of Humber and the Lakes; less confidently so, in those of the Tyne and West Lowlands.

486. PASTINACA SATIVA, *Linn.*

Area 1 2 3 4 5 6 * 8 (9) 10 11 * * * * (16).
South limit in Devon, Isle of Wight, Kent..
North limit in Durham and —— ?
Estimate of provinces 9. Estimate of counties 30.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Viatical, Septal, &c. Perhaps the type of distribution may partake of the Germanic almost equally as of the English. Grows on the coast of Lancashire; but I could not satisfy myself of its being truly native there. In Yorkshire, only two localities appear to be known; and for one only of these can I cite any good authority; namely, that of Marrick Park, near Richmond, where the plant is found by Mr. James Ward. But since it seems to be truly wild in Durham and Nottinghamshire, probability may be held in favour of Yorkshire also.

487. HERACLEUM SPHONDYLIUM, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
A. A. regions. Inferagrarian—Midarctic zones.
Descends to the coast level, in the Peninsula.

Ascends to 900 yards, in the East Highlands.

Range of mean annual temperature 52—38.

Native. Septal and Viatical. One of the commonest species of its order in the British islands; growing chiefly in damp and shaded places, at the sides of fields, without being strictly either a septal or viatical plant.

488. TORDYLIUM MAXIMUM, *Linn.*

Area * * 3.

South limit in Middlesex and Bucks.

North limit in Oxfordshire.

Estimate of provinces 1. Estimate of counties 3.

Latitude 51—52. Local or Germanic type of distribution.

Agrarian region. Inferagrarian zone.

Descends nearly to the coast level, in Thames province.

Ascends to 50 yards, more or less, in same province.

Range of mean annual temperature 49—48.

Denizen. Septal. A very local species, occuring only in the three counties above mentioned. By some accident, the Buckingham locality is twice printed in the New Guide; namely, in its proper county, and likewise under that of Hertford.

TORDYLIUM OFFICINALE, *Linn.*

Area [* * 3].

Incognit. Supposed to have been formerly found about Isleworth; but it is now said that the locality belongs to the preceding species, and not to this present one.

489. DAUCUS CAROTA, *Linn.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Sutherland, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian,—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Native. Pascual, Viatical, &c. A common plant; especially so, near the coasts. As it is stated to be abundant in Shetland, and grows also on the north coast of Sutherland, I have ventured to reckon the Orkney Isles in the estimate, although the name does not occur in Dr. Gillies's Manuscript Flora.

490. DAUCUS MARITIMUS, *With.*

Area 1 2 3 * * 6 7 * * * [11 * * * * 16].
South limit in Cornwall, Isle of Wight, Kent.
North limit in Anglesea and —— ?
Estimate of provinces 5. Estimate of counties 12.
Latitude 50—54. Atlantic type of distribution.
Agrarian region. Inferagrarian zone.
Descends to the coast level, in the Peninsula.
Ascends, at the coast level, to North Wales.
Range of mean annual temperature 52—49.

Native. Littoral. I am very imperfectly prepared to illustrate the distribution of the present species. The isles of Skye and Lismore, in the West Highlands, have been

indicated for it; as also the county of Durham. Otherwise, it is restricted to the southern and south-western coasts, as far as my compilation of localities can show those which have been reported for it. The genus Daucus requires a very careful revision; and it is likely that even our only two native species are frequently confused one with the other.

491. CAUCALIS DAUCOIDES, *Linn.*

Area 1 (2) 3 4 5 * * 8 * 10 11.
South limit in Kent, Surrey, Somerset.
North limit in Durham and Yorkshire.
Estimate of provinces 7. Estimate of counties 15.
Latitude 51—55. Germanic type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends nearly to the coast level, in England.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 49—48.

Colonist. Agrestal. Apparently introduced by agricultural operations, and possibly also through ballast. Is it a permanent weed of corn-fields in Somerset, or only a temporary introduction? That county is the only one in the Peninsula, for which I find a habitat of this species on record. In the Channel, too, I am aware of only a single and much-to-be-suspected locality; namely, "about an old lime-kiln at South Haven" (Salter's Botany of Poole).

492. CAUCALIS LATIFOLIA, *Linn.*

Area 1 2 3 4 * * * [8].
South limit in Somerset and Hampshire?
North limit in Cambridgeshire and Bedfordshire.

Estimate of provinces 4. Estimate of counties 6.
Latitude 51—53. Germanic (?) type of distribution.
Agrarian region. Inferagrarian zone.
Descends nearly to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in Thames or Ouse.
Range of mean annual temperature 50—48.

Colonist. Agrestal. Very rare; and, perhaps, scarcely entitled to a higher grade than that of an alien. The province of the Channel rests on the sole authority of Hudson's Flora Anglica, where the habitat is given "circa Crook's Easton, in comitatu Hamptoniensi." The locality of "Dove Dale" in Derbyshire, must refer to some other plant. I posses specimens from Somerset only, through the Botanical Society of Edinburgh. Mr. Babington intimates that it still grows in Cambridgeshire; and Mess. Webb and Coleman have seen dried specimens, which were collected in Hertfordshire.

493. TORILIS ANTHRISCUS, *Gaert.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 16.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Moray, Aberdeenshire, Argyleshire.
Estimate of provinces 16. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—47.

Native. Septal. Frequent or common in the English provinces; less so, in Scotland. Said to be frequent in Moray, not frequent about Aberdeen. Possibly the North Highland province should have been taken into the estimated provincial census.

494. TORILIS INFESTA, *Spreng.*

Area 1 2 3 4 5 6 7 8 9 10 * * * [14 * 16].
South limit in Devon, Isle of Wight, Kent.
North limit in Yorkshire and Lancashire.
Estimate of provinces 10. Estimate of counties 30.
Latitude 50—55. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—47.

Native. Agrestal and Viatical. The occurrence of this species on hedge-banks and by road-sides, in additon to its more frequent appearance among corn, seems to warrant our adoption of it as a true native. Two Scottish habitats have been recorded; namely, on the island of Lismore (Lightfoot), and road-sides about Edinburgh, common (Greville); but there would seem to have been some mistake of another plant for this present one.

495. TORILIS NODOSA, *Gaert.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 * 14.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Edinburghshire, Cumberland, Man.
Estimate of provinces 13. Estimate of counties 50.
Latitude 50—56. English type of distribution.
Agrarian region. Inferagrarian—Midagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 50 or 100 yards, in England.
Range of mean annual temperature 52—47.

Native. Glareal and Viatical. Apparently unknown in the West of Scotland, and scarce in the eastern counties of the Lowlands. As it grows in dry sunny places, the temperature of 47 may be a degree too low, although such would be the general climate of some of its more northern and inland localities.

496. SCANDIX PECTEN, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 * 13 14 15 * 17 (18).
South limit in Cornwall, Isle of Wight, Kent.
North limit in Orkney, Ross-shire, about Glasgow.
Estimate of provinces 17. Estimate of counties 75.
Latitude 50—58. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 52—46.

Colonist. Agrestal. Frequent in the corn-fields of England; decreasing northward, and perhaps kept in the Highland provinces only by importation with seed from abroad, or from the more southern provinces. I possess a specimen among Dr. Gillies's Orkney plants, collected in a flax field. In the Flora of Moray, it is marked as doubtfully native, though plentiful in one or two localities. In the Flora Abredonensis, it is said to be rare. The name is marked in Mr. Gordon's checked list of Ross plants. I observed a plant or two in a field near Perth. In the Edinburgh Society's Catalogue, marked "very common." And according to Hopkirk it is common also about Glasgow.

497. ANTHRISCUS VULGARIS, *Pers.*

Area 1 2 3 4 5 * 7 8 9 10 11 * 13 14 15 * 17 18.
South limit in Devon, Isle of Wight, Kent.
North limit in Shetland, Sutherland, Moray.
Estimate of provinces 17. Estimate of counties 60.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.
Descends to the coast level, in the Peninsula.
Ascends to 100 or 200 yards, in England.
Range of mean annual temperature 51—46.

Native. Viatical and Septal. Not decidedly a frequent plant in England, and scarce in Scotland. It is stated to be abundant in Shetland, which could hardly have been anticipated. I observed it at Golspie, which is the only habitat for the North Highlands, among my notes. Said to be frequent in Moray, not common about Aberdeen, very common about Edinburgh, common about Berwick. For the west of Scotland, I am aware of only one county on record for it; namely, Lanark. Under these circumstances, I have not reckoned the West Highlands in the provincial census.

498. ANTHRISCUS SYLVESTRIS, *Koch.*

Area, general.
South limit in Cornwall, Isle of Wight, Kent.
North limit in Shetland, Orkney, Hebrides.
Estimate of provinces 18. Estimate of counties 82.
Latitude 50—61. British type of distribution.
Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 400 or 450 yards, in East Highlands.

Range of mean annual temperature 52—43.

Native. Septal and Sylvestral. Even more common than the Angelica and Heracleum on the low grounds; but ascending only to much less elevation on the mountains; and perhaps less common than those two plants in the low valleys of the Highlands.

499. ANTHRISCUS CEREFOLIUM, *Koch.*

Area (1 * 3 4 5 * * * 9 * 11 * 13 14 15).

Alien. Occasionally found in a half-wild state about road-sides and on rubbish heaps, near gardens in which it has been cultivated.

500. CHÆROPHYLLUM TEMULENTUM, *Linn.*

Area 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17.

South limit in Cornwall, Isle of Wight, Kent.

North limit in Ross-shire and Dumbartonshire.

Estimate of provinces 17. Estimate of counties 75.

Latitude 50—58. British type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends to the coast level, in the Peninsula.

Ascends to 100 or 200 yards, in England.

Range of mean annual temperature 52—47.

Native. Septal. Very frequent in England; much less so, in the Highland provinces. I have noted it as seen at Dumbarton, Stirling, Alloa, Perth, and Dingwall; but not in any place more within the Highland tracts. In the Flora of Moray, it is marked as a doubtful native; and as a rare plant, in that of Aberdeen.

500*. CHÆROPHYLLUM AROMATICUM, "*Linn.*"

Area (15).

Alien. "By the side of the river called Lunan and Vennie, not far from Guthrie." (G. Don).

CHÆROPHYLLUM AUREUM, *Linn.*

Area (14 15).

Alien. Said to have been found at Corstorphine, near Edinburgh; also by the sides of corn-fields, between Arbroath and Montrose.

501. MYRRHIS ODORATA, *Scop.*

Area 1 * 3 * 5 6 7 8 9 10 11 12 13 14 15 16 17 18.

South limit in Somerset and Surrey.

North limit in the Hebrides and Ross-shire.

Estimate of provinces 16. Estimate of counties 50.

Latitude 50—59. Scottish type of distribution.

Agrarian region. Inferagrarian—Superagrarian zones.

Descends nearly to the coast level, in the Peninsula.

Ascends to 200 or 300 yards, in England.

Range of mean annual temperature 49—45.

Denizen. Septal, &c. Either native or perfectly naturalized in the more northerly provinces of England; established, though less like a native, in several places in Scotland. In the provinces of the Thames and Peninsula, extremely local; and, perhaps, it would have been better to treat the plant as only an alien in those provinces; con-

sidering its range and area, as a denizen, to commence in South Wales, the Severn, and the Trent provinces.

502. CORIANDRUM SATIVUM, *Linn.*

Area (* * 3 4 5 * * 8 9 * 11 * 13 * 15).

Alien. Occasionally found as a waif through cultivation. In some spots, it would seem to be better established; since it is thus recorded by Turner, in the Botanist's Guide :— "Wild and uncultivated places about Folkingham, very plentiful, and apparently indigenous."

ECHINOPHORA SPINOSA, *Linn.*

Area [* 2 3 * * * * * * * * 12].

Incognit. Said to have been found near Weymouth, in Dorsetshire; on the beach between Faversham and Seasalter, and elsewhere in Kent; also to have been "observed by Mr. Lawson, at Roosebeck, in Low Furness," where it was sought unsuccessfully by Mr. Woodward. Either the plant has become extinct or some other had been mistaken for it.

APPENDIX.

Note in explanation of the resemblance between the 'types of distribution' and the 'floras' of Professor Edward Forbes.

In accordance with the intention intimated on page 55 of the present volume, the Author now proceeds to make some comments upon the similitude between his own 'types of distribution,' explained on pages 43—54, and certain so-called 'floras,' announced by Mr. Forbes for the basis of his hypothesis concerning the origin and migration of British plants. If, while so doing, he cannot avoid giving the matter an aspect unpleasant and unfavourable to Mr. Forbes, the latter must remember that his own neglect of the courtesy and justice usually shown to the rights of priority, among the cultivators of science, is the cause to which any such disagreeable results may be traced back.

The earlier pages of this volume, as above referred to, explain a mode of grouping plants, founded upon certain leading peculiarities of their distribution with reference to the southern or northern, the eastern or western, and the mountainous parts of the island. That mode of grouping

plants into 'types of distribution' was originally proposed in a small volume entitled 'Remarks on the Geographical Distribution of British Plants; chiefly in connexion with Latitude, Elevation, and Climate,' which was published in 1835. The types were there very briefly explained; but a tabular list of all the known British species was given in an Appendix to the same volume, and each species was severally referred to its appropriate type, after a laborious comparison of published records and numerous manuscript notes of localities. The numerical value or proportions of the types might thus be readily ascertained by reckoning up the number of species assigned to each of them.

Ten years afterwards, in 1845, Mr. Edward Forbes, Professor of Botany in King's College, London, made a communication to the meeting of the British Association, assembled at Cambridge, in which he announced that "the vegetation of the British islands may be said to be composed of five floras;" obviously meaning, that the species might be arranged into five groups, in accordance with peculiarities of their geographical distribution. To account for these alleged five floras, he advanced a conjectural hypothesis, that their species had been created in different places, and at different geological periods; also, that they had migrated into Britain from those different places, by different routes, and at different and widely distant periods; which places, routes and periods he endeavoured to fix and explain.

It is hoped that either a subsequent volume of this present work, or a separate publication, may be devoted to the external relations of British botany, treated in accordance with the truths of Nature. At present the reader's attention is requested simply to the distribution of plants within Britain itself. Omitting the Hebridean, which in-

cluded only some half-dozen species of the extreme north and north-west of Scotland, the original types of the 'Remarks' were as follows:—

1. Plants of the south-west of England.
2. Plants of the south-east of England.
3. Plants of the south of England, decreasing northwards.
4. Plants more generally distributed in Britain.
5. Plants of Scotland or the north of England, decreasing southwards.
6. Mountain plants of Scotland and England.

According to Mr. Forbes, the distribution of our indigenous plants is such as to associate them into the five following groups, being those which he designates 'floras:'—

1. Irish plants, not found in Britain.
2. Plants of the south-west of England.
3. Plants of the south-east of England.
4. Mountain plants of Scotland and England.
5. Plants more generally distributed in Britain.

Thus far, these 'floras' present a close similarity to the 'types,' as originally and briefly set forth in the 'Remarks,' and repeated, somewhat more at length, in the preceding pages of the present work, with some unimportant variations. The chief differences are seen in the addition of a first and distinct 'flora' for the few (falsely stated to be "many") species peculiar to Ireland, and which were not included in the 'Remarks,' as that volume related only to Britain proper. Besides this addition (a mistake in itself, for the peculiar Irish plants mostly belong to the south-west or Atlantic type of the 'Remarks,') there is also a suppression of the English and Scottish types, which do not harmonize with the hypothesis.

The communication of Mr. Forbes is reported at considerable length in the volume for 1845, published in the name of the British Association, in the Literary Gazette, in the Athenæum, and in the Annals and Magazine of Natural History. It is believed that no wrong will be committed by attributing all those reports, directly or indirectly, to the pen of Mr. Forbes himself. There is great sameness among them. The printing of such reports in the volumes published for the Association, is made conditional upon the authors of communications themselves sending the reports of their own papers. And small doubt indeed can exist respecting the authorship of the report in the Literary Gazette, where the communication of Mr. Forbes is so highly complimented.

Those various reports are worded in such manner, as unavoidably to impress readers with an idea that Mr. Forbes himself had originated the arrangement of British plants into the "floras." The reports contain no intimation which could prevent the readers of them from inferring that such a mode of grouping plants was quite original, and also wholly and solely a result of Mr. Forbes's own individual investigations into the distribution of our native plants, both in Britain and elsewhere. Accordingly, the Author of the 'Vestiges,' in his after-published volume of 'Explanations,' very excusably attributes it wholly to Mr. Forbes, and politely compliments the "really ingenious" writer, for that single portion of his communication to the Association; at the same time, discarding all Mr. Forbes's more hypothetical views erected thereon, as unsound or unworthy of attention.

And yet, in truth, the alleged 'floras' were little else than a garbled reproduction of the 'types of distribution,'—taken from the ten-years-old volume without acknowledgement,—varied too probably by sheer guess-work,—and then

republished as if they had resulted from Mr. Forbes's own individual investigations. But it must be obvious enough that the mere repetition of an arrangement previously before the public, whether disguised or undisguised, could add nothing to existing knowledge respecting the distribution of plants in this country. Nor would a variation of that arrangement be likely to conduce to the advance of scientific knowledge, unless made by a competently informed botanist, and in such manner as to render it more exactly accordant with the truths of nature. Such a result, it is confidently believed, Mr. Forbes's individual knowledge of the distribution of British plants was very far from adequate to realize; for, whatever may be his scientific merits in other respects, that gentleman's repute, as a botanist, is more academical than personal. Moreover, no real knowledge of vegetable geography was indicated in the reports. They conveyed only generalities, vaguely expressed, without the mention of a single plant in example of any of the so-called 'floras.' And the pervading character of the whole communication, as reported, was that of a hasty and untried fancy, for support of which the propounder intended to find his facts at some after time.

Since the Cambridge meeting of the British Association Mr. Forbes has printed a second essay on the same subject; and which, it is understood, will be published in a volume connected with the Geological Survey. This time, there is so great a show of evidence adduced in seeming support of the hypothesis, that it will doubtless appear very plausible in the eyes of those persons (not botanists) to whom the *ipse dixit* of its proposer is a sufficient warranty for the accuracy of his facts. This time, also, Mr. Forbes does refer to the previously published geographico-botanical arrangement of the 'Remarks;' although his passing allusions thereto are conveyed in terms which

have more the effect of slurring over his own obligations to that work, than of admitting it to have been the source whence he took the idea of his 'floras;' and from the appendix to which he ascertained their comparative "magnitude as to species."

Contrary, however, to the very significant peculiarity of the earlier publication from Cambridge, the second treatise is devoted chiefly to zoological considerations. But having at first proposed his hypothesis as being one founded upon the distribution of plants, he was of course obliged to adduce some sort of botanical evidence in seeming confirmation. Accordingly, a few lists of species are given, evidently made up from the slight notices of habitats introduced into 'Babington's Manual of British Botany.' Though Mr. Forbes has not acknowledged the special manner in which he was indebted to that useful work, in making up his meagre lists, they yet afford ample internal evidence of their origin from its pages, much more than from any knowledge of vegetable distribution proper to Mr. Forbes himself, or ascertained through his own investigations. Indeed, he has copied so blindly therefrom as to follow its imperfections uncorrected; including a tell-tale error of the press, precisely of a kind to mislead and betray the copy-wright from home: while he has also, in other cases, substituted his own erroneous interpretations instead of the facts rightly, though not precisely, stated by the author of the Manual; through attempting to specialize and apply the general indications of the Manual, without first caring to make himself acquainted with the facts truly intended thereby.

Easily may the result be guessed. Borrowed facts, misunderstood, and applied by a forgetive imagination, make up the botanical illustrations in favour of the hypothesis. And thus, so far from really establishing that hypothesis

upon any sound botanical evidence, the second attempt is rendered little better than a burlesque upon the vegetable geography of Britain, by the partial selection of the facts adduced, their inaccuracy or inapplicability, and an inattention to those climatal requirements of the species, which must of themselves constitute insuperable objections against the soundness of the hypothesis respecting their origin and migrations. In short, considering the small number of the pages in Mr. Forbes's second essay, which are devoted to the botanical bearings of the subject, it absolutely teems with errors in its botany—inconclusive arguments, inconsequent logic, inept illustrations, and the guesswork of the imagination put forth ostensibly as the ascertained facts of science.

Taking the two publications in connexion—the first crude paper got up for reading at the British Association, with the more laboured subsequent pages penned for the Geological Survey, their internal evidence would justify a belief that their author was not drawing upon the resources of his own acquaintance with botanical nature, when he wrote the paper reported as having been read before the Association. But, for the satisfaction of those minds which can make inferences only from more direct evidences, it may be as well to refer to a record which is entered in the Library loan-book of the Linnean Society, showing that Mr. Forbes actually borrowed a copy of the 'Remarks,'—the work in which the corresponding 'types of distribution' were originally proposed,—from the Society's library, on the 16th of June, 1845; namely, about a week before the meeting of the British Association at which his first paper on the subject was read.

With that work before him, slight and sketchy as it is allowed to be, an "ingenious" copyist might have written the paper in less than three hours. But in the absence of

that work, and of other volumes connected therewith, by the same author, the close labour of many months (or, rather, of years) would have been required for collecting and comparing the necessary thousands upon thousands of facts in detail, and working them out to any such generalized summaries as those which are announced in the reports of Mr. Forbes's communication to the Association; and which are not announced as the summaries of any other individual than himself.

Botany, be it remembered, afforded to the Zoologist the whole and sole basis of his earlier paper, as reported from Cambridge. There existed no zoological work which could have supplied any similar basis. But there did exist one such botanical work, and Mr. Forbes temporarily possessed himself of that work shortly before his paper was read.

Can there remain a doubt as to the reasons wherefore the zoologist first founded his hypothesis on the distribution of plants, instead of basing it upon that of animals?—or, as to the source whence a ready-made foundation for his paper was derived?

If not, then why did Mr. Forbes's own report of his own paper, and his subsequent lecture in London, on the same subject, convey a different idea to his readers and audience, and lead them to attribute the whole botanical merit (if any there be) to Mr. Forbes himself?

END OF VOLUME I.

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